3-1986

# Hunter-Gatherer Mortuary Variability: Toward an Explanatory Model

Jack L. Hofman
*University of Tennessee, Knoxville*

To the Graduate Council:

I am submitting herewith a dissertation written by Jack L. Hofman entitled "Hunter-Gatherer Mortuary Variability: Toward an Explanatory Model." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Anthropology.

Walter E. Klippel, Major Professor

We have read this dissertation and recommend its acceptance:

Charles H. Faulkner, Richard L. Jantz, Edward E. C. Clebsch

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

I am submitting herewith a dissertation written by Jack L. Hofman entitled "Hunter-Gatherer Mortuary Variability: Toward an Explanatory Model." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Anthropology.

Walter E. Klippel, Major Professor

We have read this dissertation and recommend its acceptance:

Accepted for the Council:

Vice Provost
and Dean of The Graduate School

# HUNTER-GATHERER MORTUARY VARIABILITY:
# TOWARD AN EXPLANATORY MODEL

A Dissertation

Presented for the

Doctor of Philosophy

Degree

The University of Tennessee, Knoxville

Jack L. Hofman

March 1986

# ACKNOWLEDGMENTS

This dissertation is dedicated to Drs. Robert E. Bell and George C. Frison, whose distinctive and whole-hearted approaches to archaeology have served to sustain and inspire my interests for years. I have learned not only from what these teachers have said and written, but also by what they have done in their day to day archaeological pursuits and how they have done it. Also, to my father, Russell, who took, me as a boy of 12 to hear Dr. Bell speak. And, to my mother, Lucile, who always encouraged my interest in rocks and bones, impractical as it must have seemed on some of those thirsty days in western Oklahoma. Finally, my pursuit of archaeology may never have gone beyond an interest in arrowheads if Don Wyckoff had not provided the incentive, avenue, and encouragement which turned my energies toward a college education. My perspectives on college and archaeology have changed somewhat since 1971, but my appreciation for Don's support and friendship is immense and deeply felt.

Larry Todd has been the single most important partner for encouragement, criticism, and friendship during these graduate school years since 1977. My indebtedness to Larry deserves a poem to which I am unable to do justice. I'll just say he has helped cinch up the saddle on my archaeological broncs many times.

My doctoral committee Walter E. Klippel, Charles H. Faulkner, Richard L. Jantz, Edward E. C. Clebsch have been patient and very supportive, and I would not ask for a better group of scholars and teachers to work under. Their insightful comments about this study and genuine interest in the ideas presented here have been of great benefit to me. Walter Klippel has done more than any other individual to make it possible for me to pursue graduate studies in archaeology. On his own accord he has developed research programs enabling me to remain employed and in school during the time I was conducting thesis and dissertation research. Hopefully, completion of this initial step in my education will be seen as at least partial thanks for his efforts. Whatever I have learned about "making it work" from monday to tuesday is due to Walter's teaching.

Other faculty at The University of Tennessee have supported my research and education in a variety of ways which I can only inadequately acknowledge. Michael Logan has essentially been an undeclared member of my dissertation committee, and I deeply appreciate the time he has taken to read and comment upon some portions of this dissertation. Mike is an exceptional teacher and a cherished friend. William Bass, Jeff Chapman, Paul Parmalee, Jan Simek, Fred Smith, and Pat Willey have consistently supported my efforts in graduate school and each has provided encouragement and assisted me in a variety of ways. Pat Willey deserves special thanks for his efforts and interest in completion of the analysis of cremation remains, including identification of identifiable elements

and study of the modern cremation. I cannot acknowledge the full extent of his contribution in this writing, but the study would have been much less complete without his efforts. Jeff Chapman greatly assisted my work with collections in the McClung Musuem, and his interest in this study is greatly appreciated.

Some of the numerous people who have contributed to the completion of this study deserve special mention. Robert Entorf has been an enjoyable and tolerant office mate, and his assistance with computer problems is deeply appreciated. Access to the Entorf computer system made it possible for me to afford to produce this manuscript according to graduate school specifications. Bob Entorf and Audry Grubb have been true friends and adored baby sitters, and have eased the load many times in many ways. Terry Faulkner has been a dear and supportive friend and worked on some of the figures in this study. Mary Ellen Fogarty analyzed the non-human faunal remains from the cremation features at Ervin, but even more important were her comments on the "model" and general support and interest in this work (and baby-sitting efforts). Gary Crites has served as a sounding board and provided considerable moral support during my "tenure" in the Anthropology Annex. His appraisals of how the graduate school system operates, and how the world works often verged on realistic and have at least provided food for thought and entertainment. To all the members of the Annex Coffee Achievers, thanks for the java memories.

Darcy Morey (Jessie's first baby-sitter) has remained a loyal and highly respected colleague, even during these years when the Cornhuskers are no match for the Sooners. Dan Amick, Cliff and Donna Boyd, Charlie Hall, Lynn Snyder, Bill Turner, are thanked for their supportive interest and friendship. Bruce Manzano aided with identification of the non-human remains. Henry Case analyzed the infant remains from Feature 27. Carl Kuttruff provided access to the cremation remains from site 40DV34. John T. Dowd provided access to the cremation remains from the Anderson site and shared information about the Anderson burials with me.

References, articles, encouragement, and criticisms have been offered from a number of scholars and have appreciably enhanced this study. These individuals include Brad Bartel, William M. Bass, James A. Brown, Jefferson Chapman, Doug Charles, Robert C. Dunnell, James B. Griffin, Richard L. Jantz, Walter Klippel, Michael H. Logan, Bruce Manzano, John M. O'Shea, J. Dan Rogers, Nan Rothschild, Joseph A. Tainter, David H. Thomas, Neal Trubowitz, Susan Vehik, Polly Wiessner, Pat Willey, Howard D. Winters, and David R. Yesner. My sincere gratitude to these individuals for their considerations of my interests and requests. None of these persons, however, necessarily concur with the ideas presented herein.

Ervin site research has been supported by the Tennessee Valley Authority contract TV-49244A with Walter E. Klippel serving as Principal Investigator. The Robert Cecil Ervin family is acknowledged for their interest in and patience with our field work at their site. The extra efforts of the field crew, especially

Alicia Lafever, Kay Moneyhun, Nina Fitzgerald, Keith Hemphill, Howard Haygood, Jane Horton, Will Hines, Lee Ferguson, Steve Johnston, Connie O'Hare, Anna Dixon, Harley Lanham, Pat Hofman, Bill Morgan, Lee Tippett, and Andy Bradberry made it possible to do more than the money would really allow. As ever, the backhoe work of Charlie and Dewight Hines was always right on target. Charlie's wit and stories always made the sweat bee days more enjoyable.

It is perhaps inappropriate to save my thanks to Pat until last. Certainly her input goes back before the beginning of this study. Her support and work toward my "finishing" this study have been ever present and most understanding. She has been mother, baby-sitter, teacher, scholar, editor, friend, cook, ego-booster, broke, underpaid, and endlessly put upon, yet remains beautiful and fun to be around most of the time. This has truly been a joint effort and I hope she, more than anyone else, is satisfied that the end result has been worth the trouble.

## ABSTRACT

Information on mortuary practices and mortuary remains is here used to study hunter-gatherer organizational variability. Ethnographic accounts are used to develop expectations about the impact of organizational variation and mobility on mortuary behavior. Archaic burial sites in the Middle South and Midwest are used to archaeologically evaluate some of these ideas. Most archaeological studies of mortuary practices have relied upon gender, age, and status as sufficient elements for explaining mortuary variability. These studies have usually concerned sedentary groups which exhibit fairly stable composition and economies. Many hunter-gatherer groups, however, were not sedentary or organizationally stable. Therefore, I argue that some assumptions used in many mortuary studies are not appropriate for the interpretation of hunter-gatherer mortuary practices.

Differences in mobility should be reflected in the proportion, age, and sex composition of secondary burials at hunter-gatherer sites. The degree and nature of mobility also impact the development and use of burial sites. Secondary burial should be most frequent when residentially mobile groups occupy large economic territories, but have fixed seasonal aggregation sites. For logistically mobile groups, secondary burials should include a high proportion of adults who were involved in long-distance movements. Problems in the archaeological recognition and recovery of secondary burials are

investigated. Secondary burials have probably been under-reported in many archaeological studies.

Spatial and temporal predictability of resources partially determine hunter-gatherer group mobility and organization. Group fusion and fission patterns are important in structuring aggregate group rituals, including funerals and other rites of passage. These activities were important to long term group livelihood and viability. Distinctive mortality distributions are recognized from Archaic sites interpreted to represent aggregate group occupations versus family group occupations. The aggregate group burial pattern includes individuals of importance beyond the family level (primarily economically and reproductively active adults) who were buried at aggregation sites whenever possible. The family group pattern includes burials of individuals, especially the very young and very old, who were important at the family level. These individuals were commonly buried at seasonally used family campsites if they died during periods of group fission.

# TABLE OF CONTENTS

LIST OF TABLES

# LIST OF FIGURES

FIGURE | PAGE

FIGURE PAGE

FIGURE PAGE

# I. INTRODUCTION

Categorical, typological, or normative thinking has been a pervasive aspect of much archaeological and anthropological research up to the present time. Variability, in and of itself, has rarely been treated as an important topic for serious study (Dunnell 1982; Pelto and Pelto 1975; Plog 1974). This investigation, however, emphasizes variability and is directed toward highlighting aspects of the archaeological and ethnographic records which do not fit well with some commonly used interpretive conventions. We stand to learn the most from those things that do not fit our operational models. Little is learned if all we encounter falls neatly into our preconceived notions of how things are. It is the surprises, the unexpected observations, which provide the incentive for improved understanding and for development of refined models. Finally, when there are enough counter instances or variants for a pattern to be defined, it can be profitable to begin looking at the world in a different way, to reevaluate the standing interpretive framework. We should, ultimately, learn the most by pursuing the unexplained, the unaccommodated.

Probably every aspect of the archaeological record holds "surprises." They occur in nearly every project of an extended duration, whether in the field or in the laboratory. It was one such surprise which provided the impetus for this study. In 1983, during field investigations at the Ervin site, an Archaic shell midden located on the Duck River in Middle Tennessee, we encountered

variability in the burials which was, to me, unexpected at the time. My previous exposure to shell midden sites in the Middle South was primarily through published literature, and my expectations were fairly well set. It was apparent in the published reports that flexed burials were the normative or typical treatment, with secondary bundle burials a minority type. Near the close of the field work at the Ervin site, however, after several standard Archaic flexed burials had been encountered, an interesting feature was uncovered which contained numerous burned bifaces and some burned bone. Some of the bone was apparently human. As the likelihood grew that the feature represented a human cremation burial, so did the questions. Was this an Archaic cremation? Were Archaic cremations common in the Middle South? Would we have recognized this feature as a cremation as readily if the abundant bifacial artifacts had not been present? Why did these Archaic people cremate some individuals and not others? My expectations about what the Middle Archaic archaeological record in the Middle South was supposed to look like began to falter.

After documenting three cremation burials at Ervin in probable Archaic contexts, I intensified the search for comparable cases in the available literature on the region's Archaic sites. Previous research in the area had documented the occurrence of cremation burial during the Woodland Period (Butler 1977; T. Brown 1982a, 1982b; DuVall 1982), and large bifaces similar to the burned specimens from the Ervin cremations were fairly like pieces recovered from various Mississippian Period sites (Brehm 1981; Brown 1976;

Kline 1982; Peacock 1954). Needless to say, I was anxious to receive the radiocarbon determination from a sample submitted from one of the cremations. When the cremation was dated to more than 6000 years ago (Hofman 1984a), verifying the contextual interpretation, it became obvious that my normative impression of Middle Archaic shell mound burial practices had been overly restrictive. I had expected almost all Archaic people who belonged to the same cultural tradition or lineage to bury their dead in more or less the same manner. This was, however, not a very realistic perspective (Binford 1971).

Available literature on Archaic burial practices in middle and western Tennessee contained scarce mention of cremation (but see Webb and DeJarnette 1942). While work was ongoing at Ervin, however, several accounts of Archaic cremations in the area became available. Work at the Anderson shell midden site in Williamson County, about 40 km (25 miles) north of Ervin revealed evidence of three cremations out of about 70 burials (Dowd 1981; Joerschke 1983; Steverson 1981). Futato (1983:419) reported the presence of Middle Archaic cremations in northern Alabama, a Late Archaic cremation was documented in the Normandy Reservoir (Wagner 1982; Brown 1982a), and Magennis's (1977) restudy of the Eva and Cherry site burials revealed the presence of cremations at those Archaic sites in the western Tennessee Valley. I learned of other unreported cases in Middle Tennessee which collectively indicated that cremation burials were a widespread though limited part of the burial program of Archaic groups throughout the region. Also, other occurrences of large bifacial, bipointed blades in Archaic burial contexts were documented (Futato

1983; Parker 1974). In and of themselves, these findings were of no immediate theoretical importance, and might simply have been added to the list of traits characteristic of the shell mound Archaic in the middle and western Tennessee Valley.

As it happened, however, we were interested in developing our understanding of the Archaic in the Nashville Basin of Tennessee as a case example for addressing general problems of hunter-gatherer group organizational variability, mobility, and change (Amick 1984; Hofman 1983, 1984b; Klippel 1977, 1980). Toward these goals it was important to develop as many lines of evidence as possible which might be used for monitoring, or estimating changes in, group organization and mobility. The possible occurrence and recognition of aggregation sites was of special interest in order to document potential seasonal variance in group structure and size. Recently, the importance of aggregation sites in hunter-gatherer societies, for reasons beyond simple economics, has received considerable attention (Conkey 1980). Critical to maintenance of solidarity for many mobile hunter-gatherer groups who go through cyclical periods of fission, are periodic gatherings which are conducive to rituals and interactions that enhance reintegration, cooperation, and education. Rites of passage, sometimes including burial, are one general type of activity which commonly occurs during such aggregations. Archaic shell middens in the Middle South have been suggested to represent aggregation sites, at least in some instances (Hofman 1983, 1984b).

At present there are several assumptions pertaining to Archaic Period livelihood in the Nashville Basin which I hold as operational for study of Archaic hunter-gatherer organizations in the region. These include the following: (a) not all of the Archaic sites in the region have burials, (b) some Archaic sites were probably aggregation sites, (c) these Archaic hunter-gatherers were not completely sedentary and exhibited varying degrees of mobility, and (d) factors of group mobility and organizational flexibility must be taken into account in developing adequate interpretation of Archaic mortuary behavior. An underlying premise is that the differences in mobility and organization among Archaic groups will influence or determine certain aspects of their mortuary practices, by putting constraints on their options for disposing of the dead. These potential relationships between group organization, mobility, and mortuary behavior provide the mastic for this study.

Archaeological investigation of mortuary practices has a long history. Tombs and cemeteries have been the focal point of an enormous number of archaeological expeditions. Until the late 1960s, however, much of the archaeological interpretation of prehistoric mortuary behavior was little more than romantic conjecture or descriptive accounts. The single most important collection of papers influencing modern interpretations of archaeological mortuary patterning was published little more than a decade ago (Brown 1971a). Many current models of mortuary behavior for prehistoric groups are predominantly concerned with sedentary people who had well defined cemetery areas. The importance of group mobility as a factor

in modeling or explaining mortuary practices of such groups is minimal. Likewise, short-term cyclical changes in group structure and size have not been pertinent considerations for most studies. A central goal of contemporary mortuary studies has usually been to investigate social stratification, ranking, social-cultural complexity, and the treatment of elite individuals in spatially fixed and organizationally stable societies. If, however, we are interested in how the factors of mobility and organization among egalitarian hunter-gatherers may affect burial practices, then the general explanatory framework which has developed out of the 1971 volume may not be the most productive, or sufficiently complete.

The mortuary patterns which emerge from a reconsideration of Archaic burial sites in the Middle South leave us with a large "noise" factor, if we employ age, sex, and status as the only factors used to interpret or explain variation. By taking the traditional explanatory model, developed principally for sedentary groups, and adding variables for group mobility, variation in group size, and organizational flexibility, it is feasible to look for, recognize, and accommodate patterning in the burial record which might otherwise be seen as noise. The central goal, then, of this investigation is to pursue the study of mortuary practices among hunter-gatherers in general and to develop a rudimentary model to aid in defining the relationships between hunter-gatherer mobility, organization, and treatment of the dead.

Section II provides a brief overview of the fundamental aspects of models presently in use for explaining mortuary patterning. Special emphasis is given to those studies which have considered burial programs of seasonally mobile or logistically mobile groups. Section III considers organizational flexibility and mobility among hunter-gatherers as has recently been modeled by several different researchers.

Section IV is a world-wide glance at hunter-gatherer mortuary variability with cases selected from the New World, Africa, and Australia. A diversity of environmentally distinct regions is included where there is information on critical and archaeologically relevant aspects of burial. Section V presents a model of hunter-gatherer mortuary variability relying on assumptions developed in Sections III and IV. In Section VI the distinctive nature of the archaeological, as opposed to the ethnographic, record is highlighted with special attention given to problems of recognition and recovery of necessary information from archaeological sites to make implementation of the model practical.

Section VII pertains primarily to the archaeological record in the Middle South of North America as a regional data set for an initial "on the ground" application and evaluation of some aspects of the mortuary model which is developed herein. The study closes with a reconsideration of the model based on the confrontation with the archaeological record. The kind of patterning we recognize depends to a considerable extent on the questions we are pursuing and the approach taken. The extreme importance of concomitant development of

theoretical frameworks, methods, and data collection techniques is highlighted, once again, by this study.

## II. MODELS OF MORTUARY VARIABILITY

> Trait list approaches to the description of burial customs assume an intracultural uniformity that inhibits investigation of the pattern and social significance of mortuary variation within societies. (Goldstein 1980:4)

> To date, traits have been listed and the lists compared. (Buikstra 1976:29)

There are a number of papers which provide detailed historical summaries of the developments of anthropological and archaeological thinking pertaining to the interpretation of prehistoric mortuary practices (Bartel 1982; Binford 1971; O'Shea 1984; Tainter 1978; Ucko 1969). There are also a number of recent volumes which contain overviews and address a variety of specific analytical problems (Bloch and Parry 1982; Brown 1971a; Chapman, Kinnes, and Randsborg 1981; Humphreys and King 1981; O'Shea 1984). It is not my intention to provide another overview encompassing the entire range of mortuary behavior studies. The more limited background which is presented here is intended to serve as an operational platform from which this study can proceed with problems of immediate concern, specifically the interpretation of mortuary practices among hunter-gatherers. It will become evident, however, that the primary focus here is not on the ritual, symbolic, or religious aspects of funerary behavior. It is, instead, with the more mundane, functional, and pragmatic aspects of burial practices, and how these relate to more general organizational characteristics. These matters have, I believe, been inadequately investigated in the past. Numerous other studies have

addressed the dimensional, ideological, and symbolic aspects of burial practices to various degrees (e.g., Pader 1980, 1982).

Archaeological studies of the mortuary practices of hunter-gatherers have not been pursued to the same extent as have studies of funeral practices of sedentary populations (but see Buikstra 1981; S. Binford 1968; Harrold 1980; O'Shea and Zvelebil 1984; Winters 1968). Two plausible reasons for this may be offered. First, hunter-gatherers have generally been perceived as having simple, relatively "uninteresting" burial practices typical of egalitarian groups. Secondly, many hunter-gatherer groups did not have discrete formalized burial areas or large cemeteries, which often makes acquisition of an adequate sample for pattern recognition and behavioral studies impractical, less feasible or impossible, especially if a specific group or a small region is the focus of study.

Many recent studies have been content to evaluate whether the mortuary evidence of concern reflected (in Fried's [1967] terms) some form of egalitarian, ranked, stratified, or state level society. These are, however, only typological categories each of which includes a multitude of distinctive adaptation types and cultural organizations. In this study, I am ultimately concerned with identifying and evaluating organizational diversity <u>within</u> the broadly defined group of usually egalitarian (Fried 1967), or band level (Service 1971), hunter-gatherer societies.

Previous studies have typically ended with a determination of whether a particular group, as reflected by mortuary remains, was egalitarian, or exhibited some greater or lesser degree of "egalitarianism" vis-a-vis another group (e.g., Buikstra 1976:36,60; 1981; Dincauze 1968; Lynch 1982:1123-1161; Magennis 1977; Powell and Rogers 1980:80,82; Rothschild 1979). If this is our endpoint or goal, then our studies are ultimately not evolutionary or processual, but normative and typological. Developing the ability to monitor and analyze variation, change, and continuity in the archaeological record is needed. Otherwise, we cannot expand the potential of archaeological research toward contributing to a general understanding of organization, variability, and change within egalitarian or hunter-gatherer societies.

We must accept, in this same line of argument, that the term hunter-gatherer is also typological, with many connotations but no explanatory value in and of itself. I have included in this study groups traditionally considered to be hunters and gatherers; some are sedentary, others nearly so, and still others are highly mobile. The nature of mobility is also considerably variable as is the organizational flexibility of the groups. I believe the problems of concern here have considerable relevance to many groups who are not hunters and gatherers in the traditional sense, such as pastoralists, seasonal hunters such as Plains Villagers, and others. Throughout this study I have used "hunter-gatherer" in the broadest sense, and hope in part to further document the need for refined models to

explain the diversity within these cultures (Binford 1980; Cashdan 1980; Ember 1978; King 1978; Price and Brown 1985).

In 1927, a paper written by Kroeber was published which has had a significant impact on mortuary studies. Among other things, Kroeber's paper provided one of the catalysts for much of Binford's (1971) seminal paper on mortuary practices. The latter has served as a key element in the interpretations of many contemporary archaeological studies of funeral practices. The Kroeber and Binford papers also illustrate the distinctiveness of the normative approach versus the systems or processual approach to interpretation of human behaviors reflected in the archaeological record. The pervasiveness of normative thinking about burial practices has been a major factor inhibiting development of adequate models for hunter-gatherer mortuary variability.

Kroeber's (1927) paper provides an interesting parallel to this study, in that his research question was essentially the same and was inspired by similar observations. His paper was stimulated by his "surprise" at the apparent lack of discrete patterning of burial and cremation practices among, and within, California hunter-gatherer groups. These practices did not conform to the commonly held normative assumptions about cultural trait distributions.

> . . . the distribution of burial and cremation customs failed to conform to the distribution of other cultural traits in the area and was unusually irregular in itself. The lines separating the two mortuary practices on the map ran across rather than with topographic, climatic, and floral boundaries. They departed considerably from the approximately definable limits of cultural areas or sub-areas. And there was no agreement whatever with the

> distribution of other customs connected with death, such as name taboos, mourning restrictions, property destruction, or the public mourning anniversary ceremony. (Kroeber 1927:308)

In trying to develop an explanation of this problem, Kroeber found no support for the notion that diffusion or intercultural contact was the underlying factor. He argued against Rivers' (1913:480-481) interpretation which held that similar mortuary variability among Australian aborigines was the result of contact between different groups. Kroeber believed such an interpretation to be unsupportable in the California case because of strong evidence for long-standing cultural traditions in the area, based on the continuity and stability evident in many cultural characteristics. Kroeber's answer to the problem was to argue that mortuary practices were unrelated to other aspects of culture such as group organization and subsistence, that they were "unstable," and varied unpredictably in much the same way as Kroeber saw fashions to vary. Kroeber also used a brief review of world-wide patterns, especially from Australia, South America, and Africa, to argue that the lack of patterning in the California data was recurrent in other areas.

Kroeber's initial approach was to characterize groups as using predominantly one form of burial or another. These assessments, however, were often based on very meager ethnographic or ethnohistoric evidence (e.g., Kroeber 1925:142). He used these normative or typological assessments as cultural trait characteristics for making distribution maps and comparisons. There was no systematic cultural or cross-cultural investigation as to the

specific circumstances of particular burial methods. It was assumed that each group had a single most preferred method for corpse disposal. If variability could not be accounted for in terms of diffusion, then the variation around this norm was simply not amenable to typological analyses such as performed by Kroeber. Therefore, he interpreted the variability as unpatterned and unrelated to other aspects of cultural behavior, simply because it did not pattern in the same manner.

More recent work with the California burial data has revealed patterning in the occurrence of cremation burials at a completely different level than it was sought by Kroeber. Kroeber was interested in outlining definitive sets of traits which could be used to characterize each different cultural group. A change of emphasis, in which the operation of cultural systems is the focus, indicates that the occurrence of cremations often pertains more to the circumstances of death than to an overriding cultural norm for standardized burial (Gould 1963).

Kroeber's study served to highlight the fact that mortuary variability was a common phenomenon, within as well as between cultural groups. He demonstrated that the traditional trait-list approach to documenting and interpreting mortuary practices was not particularly successful, although no gratifying alternative was immediately available. Despite some significant papers documenting intragroup mortuary variability, which also criticized the use of normative assumptions pertaining to the interpretation of multiple modes of burial within single groups (e.g., Griffin 1930; Goody

1959), normative interpretations of mortuary practices continued to be very common through the 1960s (Child 1945:14; James 1928:230; Piggott 1938; Ray 1939:64; Sprague 1967; Stanislawski 1963; Toulouse 1944:70-72) and are still encountered in contemporary papers (e.g. Alekshin 1983; Harten 1980:139; Morratto 1972; Robbins 1974:160).

Kroeber's argument that the manner of disposing of the dead was not related to other aspects of culture such as subsistence, can be seen as diametrically opposed to the systemic thinking of processual archaeology. The following statement by Kroeber was seen by Binford (1971) to illustrate the inherent limitations of the cultural-historical school of thought in American anthropology and archaeology, and it was the critical evaluation of this position which occupied much of Binford's 1971 article. Kroeber proposed that,

> . . . a feature which is pretty likely to characterize mortuary practices is their dissociation from certain large blocks of cultural activity, expecially [sic] those having to do with material and economic life, its subsistence and mechanical aspects. That is, disposal of the dead has little connection with that part of behavior which relates to the biological or primary social necessities, with those activities which are a frequent or constant portion of living and therefore tend to become inter-adapted and dependent one on the other. (Kroeber 1927:314)

If this proposition were true, then the systemic analysis of cultural behavior would be of little applicability to interpretations of burials in the archaeological record. Also, the potential for the archaeological record to contribute to an understanding of past behavioral patterns, as reflected in burial contexts, would be considerably diminished. The challenge was taken by Binford (1971)

who attempted to evaluate the appropriateness of Kroeber's position based on available evidence in the Human Relations Area Files. The significance of the results of Binford's study has been discussed repeatedly, but one of the more recent and perhaps best synopses of Binford's paper, in light of more recent research, can be found in O'Shea (1984:3-8).

The critical importance of Binford's paper was the demonstration of a significant relationship between the number of dimensions recognized by a group for disposal of the dead and the nature of their subsistence base (which Binford used as a general measure of social complexity). Binford outlined several expectations pertaining to the mortuary practices of societies with differing types of organization, status structure, or levels of complexity (egalitarian, stratified, etc.). He argued convincingly that there should be a significant degree of correspondence between the heterogeneity of burial practices and the complexity of socio-cultural organization (Binford 1971:14-15). Binford also summarized numerous documents which illustrated that factors such as age, sex, social obligations and status were important determinants in structuring the nature of mortuary treatments. These findings effectively countered Kroeber's proposals that mortuary variability was totally unrelated to other more basic aspects of cultural organizations, that such practices were unstable, and that they varied in a random manner.

In actuality, the recognition that mortuary treatment varied significantly within cultures because of differences in status (e.g., royalty versus commoners) can be traced back to very early archaeological work, for instance the work of Schliemann at Troy. In 1880 Yarrow (1880:5) wrote, "A complete account of these [burial] customs in any tribe will necessitate the witnessing of many funeral rites, as the customs will differ at the death of different persons, depending upon age, sex and social standing." In a volume published in 1908, Van Gennep (1960:146) wrote, "Everyone knows that funeral rites very widely among different peoples and that further variations depend on the sex, age, and social position of the deceased."

Binford's paper, and others in the same volume (Brown 1971b; Larson 1971; Peebles 1971; Saxe 1971) argued effectively that it was possible to do more than just document the existence of relatively higher and lower status individuals based on funerary patterns. Collectively, these papers investigated the nature of specific social organizations based on burial analyses, and showed that details of status and rank, and how these were transmitted (achieved or ascribed), could potentially be recognized in the archaeological record.

As a whole, however, the papers were predominantly concerned with sedentary groups exhibiting discrete burial areas or cemeteries. Many of the assumptions and biases inherent in these papers are therefore inappropriate if directly applied to the study of mortuary practices among mobile hunter-gatherers (but see Saxe 1971). Binford's paper is an exception, in that much of his effort

was directed toward a comparison of hunter-gatherer (egalitarian) groups with other more complexly organized groups including settled agriculturalists. Binford did not, however, directly consider the archaeological record, or the steps necessary in order to apply his findings to the interpretation of archaeological remains (O'Shea 1984).

A brief reconsideration of Binford's findings (O'Shea 1984:6-7) has shown that the mobile/sedentary dichotomy may be as important a factor in determining mortuary dimensions as the hunter-gatherer/agriculturalist dichotomy (Binford 1971:18). In other words, some of the variability in mortuary treatments apparently correlates significantly with degree of mobility or residential stability. Obviously, if the nature of mobility is important to understanding mortuary behavior, then we must seriously consider this potential correlation in study of hunter-gatherer mortuary practices.

No mortuary model has been developed explicitly for hunter-gatherers as a whole, but several basic expectations have been offered. Aspects of the potential distinctiveness of hunter-gatherer mortuary practices were noted by Binford (1971: 20-23), and include the following.

> . . . age and sex should serve more commonly as bases for mortuary distinction among hunters and gatherers; while among agriculturalists, social position, as varying independently of age and sex as well as sub-group affiliation, should more commonly serve as the basis for differential mortuary treatment. (p.20)

> . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
> . . . in egalitarian societies, very young individuals should have very low rank and, hence, share duty-status relations with a very limited number of people. (p.21)

Buikstra (1976:36) provides a summation of what has typically been viewed as characteristic burial treatment among egalitarian groups.

> The distinguishing characters of the egalitarian burial program outlined above include (1) little differentiation in type of burial treatment, and (2) access to differentiated burial treatment based chiefly upon age and sex distinction.

Trubowitz (1977:123) suggests that for egalitarian societies, "differences in disposal of the dead would be associated with age, sex, and personal achievements." Rothschild (1979:661) provides a similar perspective, with attention given to the commonly held assumption that small children and infants will not receive elaborate burial in terms of treatment or associations in strictly egalitarian societies. This position is common in many mortuary studies (e.g. T. Brown 1982a; Magennis 1977; Powell and Rogers 1980:82), but is probably a misleading oversimplification (see especially, Braun 1979:68; Brown 1981:29,34; Vehik 1983:222).

Additional assumptions commonly used in the analysis of mortuary remains are widely held and are probably inappropriate for direct application to all hunter-gatherer groups. One position most persuasively argued by Tainter (1975, 1977, 1978, 1980) pertains to the correlation between energy expenditure in the funeral program and

social status of the deceased.

> . . . when sets of mortuary data cluster into distinctive levels of energy expenditure, this occurrence will signify distinctive levels of social involvement in the mortuary act, and will reflexively indicate distinctive grades or levels of ranking. (Tainter 1978:125)

Tainter's position (see also Tainter 1980, 1983) has been criticized (Braun 1981; Brown 1981), based on problems of recognizing and measuring energy expenditure in a consistent and reliable fashion based on archaeological evidence. Also, I argue that levels of energy expenditure reflected in different types of burial among many hunter-gatherer groups may commonly represent organizational and situational circumstances and need not pattern directly with status differentiation.

There is a tendency for researchers to assume, because status differences are usually distinguished in mortuary rites in the cultural context, that differences observed in archaeological mortuary remains <u>necessarily</u> represent status, age, or sex distinctions. The comments below illustrate standard thinking in many mortuary studies.

> . . . persons who are treated differentially in life will be treated differentially in death. This assumption is necessary to bridge the gap between anthropological theory and archaeological fact. (Peebles 1971:68)

> Persons treated differentially in death were probably also treated differentially in life. (Goldstein 1980:5)

> It is assumed that distinctions visible in mortuary practices reflect <u>status</u> distinctions visible during life. If patterns <u>exist</u> in mortuary practices, it is assumed that they relate to structural <u>divisions</u> in society. (Rothschild 1979:660; emphasis added)

The problem with these assumptions arises when all variation in the mode of burial, level of energy expenditure, or nature of associations as encountered in the archaeological record is assumed to reflect only or primarily sex, age, or status differences. There are many instances in the ethnographic literature pertaining to hunters and gatherers where this is simply not the case (Binford 1971; Bushnell 1927; Drucker 1963; Gould 1963; Griffin 1930; Kroeber 1927; Ucko 1969; Yarrow 1881). It is simply not appropriate to apply all of the operational assumptions used by researchers investigating mortuary practices among sedentary groups to studies involving mobile or seasonally mobile hunter-gatherers.

Examples illustrating this problem include the "extra effort" practices of temporary scaffolding or cremation among some groups wherein the extra energy or more complex, staged funerary program can result from factors such as location of death (Griffin 1930; Gould 1963), or season of death (Orser 1980a, 1980b; Ubelaker and Willey 1978). In such situations, the influence of sex, age, and status or social relationships, though important, may be secondary to more pragmatic concerns.

I should emphasize that the importance of sex, age, and social status in all known burial programs is undeniable. These central elements, which I will refer to as the "G+A+S model" for explaining mortuary variability (G=gender; A=age; S=status and social relationships), are without question of direct relevance to interpreting the funeral practices of hunters and gatherers. The

ultimate goal of this study is to pursue the aspects of mortuary behavior that these interactive and non-additive variables do not explain or leave as indecipherable noise. Furthermore, I will argue that the residual (unexplained) variability in mortuary "patterning," which results from use of the G+A+S model, is much greater for many hunter-gatherer groups than for most non-hunter-gatherer and sedentary societies.

It is important, as a result of these circumstances, to work toward an explanatory model of mortuary variability designed to accommodate distinctive characteristics of hunter-gatherers. Specifically, such a model must take into full consideration flexibility in group size and organization, and varying degrees of mobility within and between groups.

# III. VARIATION IN HUNTER-GATHERER ORGANIZATION AND LAND USE

> When viewing culture as a system of interrelated variables, it is critical to develop theory that relates aspects of mortuary behavior to the organization of society. (Goldstein 1980:4)

The study of organizational variability among, and change within, hunter-gatherer groups is of considerable importance not only in and of itself, but also because of the critical nature of this knowledge for study of the evolution of human cultural systems in general. Hunter-gatherer societies exhibit a wide range of social structures, decision making mechanisms, and organizational complexity (Brown 1985; Cashdan 1980; Damas 1969a; Ember 1978; Lee and DeVore 1968; Yengoyan 1968). It is not realistic to consider all hunting-gathering societies to be simply organized and strictly egalitarian (King 1978; Suttles 1968). Contemporary hunters and gatherers serve to document only a portion of the range of complexity probably exhibited by hunting-gathering societies in pre-agricultural times. Therefore, much of what we will eventually learn about most hunter-gatherer groups must come from the archaeological record.

This study is in concert with numerous contemporary attempts to approach the study of hunter-gatherer organizations using complementary segments of the archaeological and ethnographic records, including environmental data, subsistence remains, site patterning, stylistic analyses of artifacts, and lithic studies (Amick 1984; Asch, Ford and Asch 1972; Binford 1978a, 1980; Conkey 1980; Ebert 1979; Hewitt 1983; Jochim 1976; Keene 1981; Kelly 1983,

1985; Klippel and Maddox 1977; Lee 1968; Lurie 1982; Magne 1983; McMillan and Klippel 1981; Oswalt 1973, 1976; Thomas 1983; Todd 1983; Todd et al. 1985; Wiessner 1983; Winters 1969; Yellen 1977a; Yesner 1977; etc.). Burial practices, of concern here, provide evidence which may also pertain to the study of group organization among hunter-gatherers. Because of the obvious need for multiple independent evaluations of interpretive models, it is important to develop numerous archaeological yardsticks for measuring variability among, and within, past cultural groups.

During the past decade, the concerted effort to bring together archaeological and ethnographic information toward building holocultural models of hunter-gatherer organizational variability has resulted in a significant body of literature (Binford 1978a, 1982, 1984; Dyson-Hudson and Smith 1978; Eder 1984; Gould 1978; Smiley et al. 1980; Thomas 1983; Wiessner 1982a, 1982b, 1983; Williams 1974; Winterhalder and Smith 1981; Yellen 1976, 1977b), and some interesting global patterns are emerging (Binford 1980; Hayden 1981a, 1981b; Kelly 1983; Lee 1968; Owsalt 1976; Thomas 1983). Contemporary studies of hunter-gatherers have provided information on a distinctive variety of hunter-gatherer organizational strategies which frame a minimum range of organizational properties which may be variously represented in the archaeological record (Bicchieri 1972; Binford 1978a; Campbell 1968; Damas 1969a; Hayden 1981a; Leacock and Lee 1982; Lee 1979; Lee and DeVore 1968, 1976; Schrire 1984; Silberbauer 1981; Steward 1938; Thomas 1983).

A useful heuristic model has been developed by Binford (1980; see also Binford 1976, 1978a, 1979, 1982, 1983a; Kelly 1983; Thomas 1983; Wagner 1960; Wiessner 1982a) in which hunter-gatherers can be compared or perceived on a continuous scale from residentially mobile foragers to logistically organized collectors based on factors of economy and mobility which in turn are highly correlated with environmental parameters such as effective temperature, biomass, and seasonality. Portions of Binford's definitions of foragers and collectors are as follows,

> . . . foragers typically do not store foods but gather foods daily. They range out gathering food on an "encounter" basis and return to their residential bases each afternoon or evening. . . .there may be considerable variability among foragers in the size of the mobile group as well as in the number of residential moves that are made during an annual cycle. (1980:5)
> . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
> . . . collectors are characterized by (1) the storage of food for at least part of the year and (2) logistically organized food-procurement parties. . . . In marked contrast to the forager strategy where a group "maps onto" resources througn residential moves and adjustments in group size, logistically organized collectors supply themselves with specific resources through specially organized task groups. (Binford 1980:10)

Limitations in applying this model to the archaeological record are, however, encountered on several levels (Binford 1980; Eder 1984; Hofman 1984b; Thomas 1983; Todd 1983:232-235; Wiessner 1982a). The identification of functionally distinct sites such as extractive camps occupied frequently by task groups as opposed to sites occupied occasionally by larger groups represents a significant problem. Likewise, distinguishing sites which represent palimpsests of functionally varied short term occupations from primary habitation

sites can be problematic (Binford 1978b, 1980, 1982, 1983c; Stevenson 1985; Thomas 1983).

Additionally, many hunter-gatherer societies have operated in complex, seasonally variable environments, and as a result, many were undoubtedly dynamically organized to allow group aggregation and dispersal. This facilitated the maintenance of socio-cultural integrative mechanisms such as trade, rites of passage ceremonies, information exchange, mate finding opportunities, and accommodated economic flexibility needed to utilize temporally or spatially incongruous resources (Boas 1964:54-55; Conkey 1980; Flannery 1968; Gorman 1972; Gould 1980; Harpending and Davis 1978; Heffley 1981; Hofman 1984b; Lee 1976:54-55, 1979:364-368; Mauss and Beuchat 1979; Mitchell 1983; Moore 1981; Thomas 1983:86-87; Wilmsen 1974; Woodburn 1968). Distinguishing such aggregation sites from repeatedly used non-aggregate habitation sites is a further problem (Conkey 1980).

In reality, many hunter-gatherer societies, especially in the temperate zone, were probably collectors for part of their economic cycle, being logistically organized and relying in part on stored or cached resources, and foragers for other parts of the cycle while living a fairly hand-to-mouth, residentially mobile existence (e.g. Binford 1982:11; Hofman 1984b; McGee 1898; Thomas 1983; Todd et al. 1985). The portion of the cycle during which a group operates using a collector strategy may correlate significantly with periods of aggregation or fusion. A major problem in any investigation of hunters and gatherers, then, is determining to what extent a particular group was residentially mobile during a particular season,

or how important logistical organization was to a given society in a specific setting.

In combination with these mobility options, an awareness of flexibility in group size and composition is important. Additionally, how and in what way did these patterns change through time (Harris 1977; Ford 1977; Testart 1982; Rindos 1984)? Severe limitations in the applicability and relevance of some previous models of hunter-gatherer organization "types" have resulted from normative, static assumptions about how these groups operated within their environments throughout the course of their economic cycles. Models of hunter and gatherer mobility and organization which portray such groups as fixed with non-flexible composition (e.g. Beardsley et al. 1956; Service 1971) must be viewed as unrealistic at best.

Due to this potential variability, archaeologists approaching the study of egalitarian or other hunter-gatherer systems in seasonal climates must, at some point, concern themselves with the seasonal aspect of hunter-gatherer adaptation (Binford 1978a; Binford and Binford 1966; Flannery 1968; Quimby 1962; Steward 1938; Thomson 1939; Winters 1969). This is critical if we accept that the organization of any specific society may change radically, dependent upon which portion of the economic cycle it is involved in. An important concern, then, in the archaeological study of hunter-gatherers in many locations is to evaluate the importance of seasonal sedentism and the nature of mobility in the organizational strategies of these past peoples.

Significant variability in the organization and land use of hunters and gatherers has long been noted in the archaeological and ethnographic records (Beardsley et al. 1956; Kelly 1983; Wagner 1960). Other models of hunter-gatherer organizational variability have been proposed in recent years which parallel in many respects the forager-collector framework utilized by Binford (Bettinger and Baumhoff 1982; Watanabe 1985; Woodburn 1980, 1982). Woodburn (1980, 1982) has classified hunter-gatherers as having either delayed-return or immediate-return economic systems. These economic groups parallel in a general way the concepts of collectors and foragers, respectively. Watanabe (1985) arranges hunters and gatherers on a scale from vegetarian to carnivorous, based on the proportion of plant and animal foods in the diet. The majority of groups fall within the category of omnivorous (Watanabe 1985: Tables 1 and 2), but groups which are predominantly vegetarian or carnivorous correspond, respectively, fairly well to the forager and collector distinction. The correlation between amount of meat in the diet and mobility, as reflected by territory size and frequency of moves, has been nicely illustrated by Kelly (1983: Figure 5). Bettinger and Baumhoff (1982) distinguish between traveller (hunting oriented, logistically mobile) and processor (vegetal food oriented, residentially mobile) strategies.

The mobility factor, including frequency of moves, distance of moves, composition of groups involved in moves, and size of territory, is central to considerations of hunter-gatherer organization (Kelly 1983). Equally important, however, is

recognition of substantial periodic changes in group composition which makes a static typological analysis of hunter-gatherer organizations unrealistic and of limited value in many analytical contexts (e.g. Beardsley et al. 1956). A consistent aspect of most hunter-gatherer groups which have been studied for extended periods, rather than just from brief encounters, is the occurrence of concentrations or aggregations of small subsistence groups into relatively larger reproductive groups. Since the work of Mauss with the Eskimo and Steward with Great Basin Shoshonean groups, periodic aggregations of varying duration have been considered a typical aspect of hunter-gatherer organization and economy (Gorman 1972; Lee 1976, 1979; Martin 1974; Wilmsen 1974).

An economic basis for aggregations has been posited in many instances and there is undisputed correlation between most known aggregations and distinctive ecological conditions. Such conditions include permanent water sources (Lee 1976, 1979; Taylor 1966); distinctive geographic features such as game crossings or mountain passes (Conkey 1980); highly predictable resource locations such as anadromous fish runs (Schalk 1977), oyster beds (Perlman 1980), and mussel shoals (Hofman 1984b); and windfall occurrences of resources (Steward 1938:237; Gould 1980:97-100; D. H. Thomas 1983:55; E. M. Thomas 1958:155). While economic factors can be used to explain the occurrence of aggregations in many situations, there is recurrent evidence that social factors may play an important or even more significant role (Conkey 1980).

It is fairly standard for archaeologists to interpret the remains of hunter-gatherers from strongly ecological perspectives (e.g. Binford 1983c; Hofman 1984b; McMillan and Klippel 1981; Reher 1977; Winterhalder and Smith 1981). The utility of such an approach is beyond question, but its limitations must also be recognized. As noted by Wiessner (1982b:62), "There is no justification for the view that, because hunter-gatherers live directly off the land, all aspects of their social organization and economy are more directly predictable from environmental variables than those of agricultural societies." There are several indications that "There is more...to aggregation/dispersion than subsistence ecology" (Conkey 1980:609). Several researchers have provided supportive evidence for this contention (Wiessner 1982b; Conkey 1980; Damas 1969b:52; Durham 1981:221; Gould 1980:100,104; Moore 1981:213; Turnbull 1968:135), but the findings of Lee (1979:366-367) are perhaps most pertinent.

> Keeping very large groups together requires special efforts from individuals. They must maintain higher levels of cooperation and coordination of hunting and gathering activities than are necessary in smaller domestic groupings . . . . If people have a good enough reason for staying together--such as the performance of a ritual--they can do so, but only if they are prepared to work harder at it. Groups of over 100 people can be sustained for months, but only at the cost of an increasingly high input of subsistence effort per capita . . . . In a large gathering, an increasingly wide radius of food resources is eaten out with each succeeding week. Accordingly, the work effort required of individuals rises with each week. As work effort increases, the individual perceives his "costs" of staying together as increasing.

Lee's remarks pertain to the !Kung San foragers, and obviously the situation should be somewhat different for collectors relying on stored or otherwise fixed resources. Regardless of the organizational stance of a specific group (though we might argue that during aggregations groups will operate as logistical collectors, whereas prior to and after aggregations some groups may act as foragers), several enticing arguments have been posited which suggest that information exchange and transmission may have been central and critical aspects of aggregations (Conkey 1980; Durham 1981; Gould 1980; Moore 1981; Turnbull 1968). Obviously, such exchanges are not dependent on immediate economic efficiency. Concerning information exchange Moore (1981:213) states,

> Seasonal aggregation provides a spatial structuring of the settlement system which extends the value of the information . . . . The benefits derived from seasonal aggregations are [may be] delayed until the following economic season. As a result, aggregation strategies need not always give the greatest immediate return. It may be advantageous to use an aggregation strategy which, while failing to give optimal returns during the period of aggregation, more than repays the shortfall through the greater access to resources during the period of dispersal.

A portion of Durham's (1981:220) argument is as follows,

> Part of an optimal foraging strategy may be a seasonal aggregation of camps into a regional band for the mutual sharing of information that can reduce movement costs.

Gould (1980:106) suggests that aggregations are critical to maintenance of social alliances and solidarity and that the

> exchange of information is at least as important as the direct or potential exchange of goods and access to key resources. Moreover, this information must be exchanged

> not only between groups (in space) but also from one generation to the next (in time).

Given these arguments, we can see that the long term evolutionary result of periodic aggregations of typically dispersed groups would have been to provide a selective advantage (increased fitness) to those groups participating in aggregation activities, over groups who operated in isolation. Conkey's (1980) suggestion that not all hunter-gatherer groups have participated in aggregations, and that we cannot assume our earliest ancestors necessarily had periods of aggregation is probably well founded. However, the long range competitive advantage, in terms of biological fitness or diversity, maintenance of intergroup alliances, and information access and transmission, may have been considerable for groups who aggregated.

The bottom line in this discussion is simply that hunter-gatherer organizational variability cannot be divorced from, nor seen only as the result of, immediate economic factors. The primary aspects of hunter-gatherer organization of concern to this study are differential mobility and group composition. These factors interact to produce an array of variability among and within hunter-gatherer groups whose livelihood depended not only on successful resource procurement, but also on dependable mechanisms for exchange of current information and transmission of traditional knowledge for use in upcoming seasons and years, and for use by future generations as well. If rites of passage ceremonies, such as funeral practices, were important rituals for transmission of information on traditional values, practices, and social relationships, then we can expect such

ceremonies to correlate significantly with aggregations among some groups. The archaeological reflections of such ceremonies can then provide insights about organizational differences among and within these societies.

The integrative social aspects of mortuary rituals have been documented since early ethnographic research (e.g. Gluckman 1937:121; Malinowski 1955; Van Gennep 1960). The following statements serve to denote the social importance of funeral rites for group solidarity and highlight the argument that more is gained from mortuary ceremony by the aggregate group than simply disposal of the dead.

> Mortuary ritual serves to emphasize the cohesion and continuity of the social order, to reaffirm relationships among the living and to resolve the dissonance created by the unpredictable loss of a community member. (Jacobsen and Cullen 1981:95)

> . . . if the community did not mourn when it lost one of its members that feeling of the social value of individuals on which the existence of the society depends would soon diminish in strength thereby weakening the social cohesion. (Radcliffe-Brown 1922:297)

> A person's death triggers mortuary rites, but an entire network of relationships gets displayed. The kinds of exchanges or manipulations of property or prestige that can occur at rites triggered by a death display power [or cooperative] relationships and dynamics within that living network . . . Much more than social relationships are displayed in mortuary rites. Themes of overall group identity and continuity and themes of other ideological importance also appear in the symbolism of such rites . . . . we come more and more to see mortuary ritual as a medium of communication whose messages can include far more than simply social information on the deceased. (Braun 1984:192)

## IV. HUNTER-GATHERER MORTUARY DIVERSITY: ETHNOGRAPHIC REFLECTIONS

> . . . in so far as mortuary practices may be accepted as partaking of the nature of fashions, they will tend to discredit certain interpretations based on them. (Kroeber 1927:313-314)

> An analysis of discrete elements such as corpse disposal, out of social context, and without regard to possible relationships between disposal and other social variables, reduces the anthropological perspective to piecemeal reconstruction. (Bartel 1982:50)

My intention in this section is to provide the ethnographic basis for a plausible model of hunter-gatherer mortuary variability under conditions of logistical and residential mobility. Just as considerable variability exists in the stability and operation of hunter-gatherer groups, so too, a wide array of mortuary treatments and levels of complexity are represented among hunter-gatherers. Patterns exist in the ethnographic data on hunter-gatherer mortuary practices, but explanation of this patterning has not advanced appreciably. Significant variability is documented in hunter-gatherer mortuary practices when considered on a global scale (Binford 1971; Davidson 1949; Kroeber 1927; Lowie 1948; Ray 1939; Ucko 1969; Yarrow 1881). Furthermore, variability within specific groups is also considerable in some cases (Bushnell 1920, 1927; Goody 1959; Gould 1963; Griffin 1930; Hertz 1960; MacLeod 1925; Orser 1980; Voegelin 1944). Primary factors credited with contributing to this variability, and generally used to interpret it, include gender, age, and social position (the V=G+A+S model). Additionally, special

society memberships, environmental limitations, unusual circumstances of death, and complexity and integration of the society as a whole have been cited (Binford 1971).

Much of the diversity in hunter-gatherer burial practices has remained as "noise" when general interpretations are attempted (Kroeber 1927). Furthermore, there has been no encompassing model developed to account for the diversity of burial treatments as expressed by hunter-gatherer groups as a whole. No predictive model for the situations in which we might expect particular kinds of burials or kinds of "cemeteries" has been offered. Several factors have contributed to this lack. Primary among these factors are: (1) the generally limited nature of the traditional V=G+A+S model when flexible, mobile groups are being considered, (2) the diverse array of documented mortuary practices, and (3) the problematic natures of the ethnographic and archaeological records.

Critical factors limiting the original documentation and interpretations of hunter-gatherer mortuary diversity include the normative assumptions of early field ethnographers and the short term, erratic nature of available ethnographic observations pertaining to specific groups. This problem has been summarized by O'Shea (1984:21), "Ethnographic accounts of native funerary customs are often based on a small number of observations, are often secondhand, and are frequently normative in character." The normative expectations of many ethnographers and archaeologists regarding burial practices have been criticized since the early and

important work of Griffin (1930:2), who summarized this problem as follows:

> When different methods of burial are found . . . workers . . . attempt to correlate the different modes with different cultural groups . . . . The idea seems to be that a given culture is to be identified by one form of burial and that in different cultures one is expected to find different methods of corpse disposal. This misconception must disappear as scientific investigation over this central area reveals the archaeological data in their true light.

Furthermore,

> There seems to be a tendency among some anthropologists to expect different cultures when different burial customs are found. They have been following the idea that change in burials probably indicates a change in culture or the presence of another tribe. (Griffin 1930:47)

These normative notions have remained quite widespread among archaeologists, as illustrated by numerous reports from throughout North America and the world (see Binford 1971:11-13). The complementary nature of ethnographic and archaeological information in the study of mortuary practices requires that the most productive use of either source must rely on the other (Trinkaus 1984). The culturally biased, often politically or ideologically motivated nature of historical documents must be taken into account. Utility of the ethnographic record is hampered by a limited number of well documented cases and often by overriding Christian influences (which may have affected the nature of burial rites, the nature of reporting, and even the extent and content of native testimony given to early reporters [Haglund 1976a:48, 1976b:85; Clow 1982:43-44]). Interpretively enticing and relatively complete behavioral aspects of funeral programs have sometimes been reported ethnographically. The

archaeological record can provide more adequate time depth, sample sizes and help document the diversity of treatments, but a variety of limiting and leveling mechanisms must be appreciated (O'Shea 1984:27-31).

## Ethnography and the Archaeological Record

It is neither plausible or realistic to assign meaning to the archaeological record based solely on the archaeological record itself (Binford 1977, 1983a, 1983b). The archaeological record is composed of static material remains and residues which, in and of itself, has no intrinsic meaning. There are many ways to attribute meaning to archaeological remains (psychological, romantic, common sense, etc.), but from a scientific perspective (Dunnell 1982) some approaches hold more promise than others. The use of ethnographic information as a tool to approach the archaeological record has a long history and wide applicability (e.g., Gould 1978; Kramer 1979). There is, however, considerable disagreement as to the most appropriate uses for ethnographic data by archaeologists (e.g., Binford 1978a, 1985; Dunnell and Simek 1984; Gould and Watson 1982; Schiffer 1978; Wylie 1982).

Observations on contemporary behavior and its material correlates, or documents pertaining to such observations and correlates, provide the foundations of much archaeological interpretation. An increasing portion of recent archaeological research has been directed toward defining relationships between specific behaviors, or actions in specific contexts, and their

material correlates in the archaeological record. Such middle range research (Binford 1977, 1978a, 1983a) is critical to the substantive growth of archaeology, just as ethnographic documentation and analogy is essential, at various levels and in various forms.

Analogies and middle range research are not, however, sufficient for productive growth of archaeology as a science. Also necessary are theoretical constructs which provide a guiding basis for approaching the archaeological record, for asking questions, and for designing research programs at various levels. Development of general theoretical or explanatory models for interpreting the archaeological record must proceed alongside middle range and documentary research. Such development also relies upon an interactive use of observations pertaining to modern behavior (ethnography) and to static remains (archaeology). Ethnographic accounts must be seen as a tool to enhance development of realistic inferences and more appropriate models for approaching and evaluating ideas about past behaviors as reflected in the archaeological record. Ethnographic analogy must not be used, however, for direct "explanations" of the archaeological record or be allowed to limit the interpretive or modeling possibilities (Wobst 1978).

Because the archaeological record is appropriately used to evaluate ideas about the operation of, and change in, cultural systems in the past, it is important to develop realistic, appropriate, and rational models of such systems for evaluation. The ethnographic record can be most useful in development of such models. Limitations of the ethnographic record for archaeological

uses have been noted repeatedly (e.g., Wobst 1978; Binford 1984; Ember 1978). Nevertheless, our best opportunities to investigate cultural systems in operation must come from this source.

This section draws on the ethnographic record in order to give support and credence to a model to be developed subsequently. It is important to emphasize, at the outset, several critical points. First, the limitations of the ethnographic record for study of mortuary practices, especially among mobile or seasonally mobile peoples are severe. Because of the nature of many ethnographic accounts, comments pertaining to the mortuary practices of many groups amount to little more than anecdotes or isolated incidents (Bendann 1930; Ucko 1969; Yarrow 1881). The significance of many mortuary events when reported in isolation is typically difficult to evaluate from the perspective of the overall organization of particular groups. Therefore, in this study, use of the ethnographic record has involved the fairly piecemeal use of widely scattered accounts pertaining to groups with various kinds of mobility. Because I am interested in the effects of various kinds of mobility on mortuary practices, and because adequate information on specific groups is relatively rare, it has been necessary to consider information from numerous groups in diverse regions.

My concern, furthermore, is not with the development of an empirical generalization (Binford 1977) which dictates what all mobile groups will do with their dead in all situations. Rather, the goal is to develop a preliminary model of general relevance to enhance the interpretation of funerary practices among mobile hunter-

gatherers at a basic level, recognizing that not all ecological, situational, and social variables have been adequately modeled for all potential situations. At this stage it is the general pattern which is of relevance, not specific counter-instances. Counter-instances will take on special relevance as continued refinement of the model proceeds, and until an alternative more comprehensive model is developed.

Because of this interest in developing a model of statistical relevance (Salmon and Salmon 1979), one that has a relatively high probability of usefulness in a variety of behavioral settings, it is neither practical or necessary to attempt an absolutely comprehensive inventory of all mortuary variability among all hunter-gatherer groups. In any event, such a survey would not, in and of itself, provide any proof that the same circumstances were reflected by the static archaeological remains of past mortuary activity. It is simply necessary to provide sufficient documentation here to show this model as a reasonable and justifiable account of hunter-gatherer mortuary variability in many known situations. We can then take this model and evaluate it against the archaeological record in a variety of contexts and gain an appreciation for its utility and applicability in past situations which may or may not be closely comparable to various known ethnographic cases. We can, however, gain an initial appreciation for the kinds of mortuary variability which might occur given different kinds of group organization and mobility.

## Ethnographic Limitations

Consideration is given below to selected ethnographic and ethnohistoric accounts of burial practices, primarily from North America, Australia, and Africa. The goal is to illustrate the nature of correlations between types of mobility and group organization and specific modes of burial--specifically occurrences of secondary burial due to logistical or timing factors. Before proceeding with this discussion I will provide a few examples highlighting problems in the use of ethnographic data for interpreting the significance of specific burial events.

As Trinkaus (1984) has noted, written records, like mortuary rituals, are forms of symboling with their own problems and inherent limitations. Particularly, there is considerable potential for manipulation and suppression of variation in rituals when they are communicated about by individuals separated in time and space (via written documents).

> It is certain, moreover, that from ethnological sources we only have reports on a very small percentage of the burials which took place and most often those accounts were concerned with the important members of society. (Griffin 1930:46)

Griffin (1930:43) comments elsewhere,

> . . . I believe it can be undeniably asserted that the methods of burial at the time of contact were as numerous and as varied as any subsequent period and that the tendency has been as the Indian culture broke down to reduce the number of methods of burial to that one of inhumation, with the body buried in a coffin at full length.

As to the representativeness of the ethnographic record,

> Ethnologists are limited by the length of time available to them to conduct fieldwork in any given setting. Rarely can they observe the mortuary rituals accorded a socially and biologically representative sample of the group; even more rarely do they have the time or opportunity to observe variation among representative samples across much of a region. (Braun 1984:194)

The degree of such limitations is typified by normative research in which groups are characterized by a specific (or a single most common) burial type. In cases where only one or a few specific funerals are known for an entire group, it was not uncommon for ethnographers to classify groups on the basis of very limited information (e.g., Kroeber 1925:142, 146). Later investigators might encounter, through observation or interview, other modes of burial and then a debate would typically set in as to who was right and wrong and what the group had "really" done in the ethnographic past. It is sufficient for present purposes to indicate that ethnographic account cannot generally be expected to detail the entire range of mortuary variability of specific groups, and we must be cautious of generalizing from specific instances of burial which just happened to be observed or reported. Ethnohistoric accounts hold the additional problem of untrained observers reporting behaviors about which they were unable to effectively communicate with natives.

The Impact of Mobility on Burial Practices

The impact of mobility and situational factors on the funeral repertoire of various groups is suggested by the following observations.

> Although the number of cases were few, differentiations related to the location at which death occurred (within the village, at a distant place) . . . were most commonly distinguished by differences in the treatment of the body itself and the location of the grave or repository for the remains. (Binford 1971:23)

Concerning the Huron, who generally practiced temporary burial or scaffolding followed by permanent bundle burial, Thwaites (1925) recorded that,

> If death occurred while a group were [sic] away from their usual habitat, the flesh was burned and the bones carried home. (from Griffin 1930:11)

Charlevoix noted the following procedure among some Chippewa who generally practiced inhumation.

> During the hunting season if an Indian died . . ., the body was scaffolded until the tribe went back to its permanent village where it was probably interred; the bodies of warriors who were killed in battle were burnt and the ashes carried back to the home encampment. (from Griffin 1930:38; see also Bushnell 1920:36)

In his discussion of cremation among various northeastern groups Bushnell (1920:37) notes,

> Probably cremation was resorted to in many instances as a means of reducing the difficulty of removing the remains from the place of death to the locality where it was desired they might be deposited . . . .

In the Southeast, the Chickasaw, who generally buried their dead soon after death, and the Choctaw, who stored bones in charnel houses until final burial, are known to have altered their normal funeral programs when individuals died some distance from the village.

> When a Chickasaw died or was killed some distance from home, his body was placed upon a raised platform . . . . When the flesh had decayed and the bones had dried, the relatives returned to the site and bundled the bones . . . . They carried them back to the town . . . . and the bones were buried . . . . (Hudson 1976:335; see also Voegelin 1944:357)

> If a Choctaw died away from home and it was impractical to bring the body back, the ashes or bones of the dead were returned. (Voegelin 1944:355)

For the Northwest Coast Haida, Drucker (1963:175) notes that although the deceased are generally placed in a grave house,

> A Haida who died far from home was cremated . . . and only the charred bones and ashes were brought home.

Among the Northern Maidu of California,

> Bodies were burned only when the man died far from home, when cremated, the ashes were taken home and there buried. (Dixon 1971:500)

In the Plateau region, a similar use of cremation is noted for some groups (Ray 1939:64-65),

> The use of cremation by the Shuswap and Thompson [Indians] is limited to deaths far from home or during warfare.

A number of California hunter-gatherer groups practiced cremation in similar situations, including the Shasta, Sinkyone, Huchnom, and

Mono. Gould (1963:155) notes that several groups

> practice burial as the primary means of disposal of the dead and cremated only those individuals who, for one reason or another, died away from home. For the most part, these individuals were men killed in skirmishes with neighboring groups while on hunting trips or raids. The most obvious reason . . . for the cremation of the body on the spot was to make it easier to carry the remains back to the home village.

Similar accounts can be noted for other groups (Bushnell 1920, 1927; Voegelin 1944; Yarrow 1881:109). But, the general purpose has been served of illustrating this general pattern of secondary burial and alternative corpse treatment due to location and situation of death, when fixed or semi-permanent habitation and preferred burial sites exist. The cases serve to document, at the very least, that different kinds of treatment and different levels of energy expenditure in funerary practices cannot always be assumed only to reflect status differences within hunter-gatherer groups.

There are important complicating factors for the archaeological interpretation of secondary burials (either cremations or bundled bones) in situations where groups have fixed habitation and burial sites. First, and most obvious, is that some groups practice cremation as a general mode of burial treatment for the majority of individuals. This is the case for some Northwest Coast and California groups (MacLeod 1925; Gould 1963). In situations where final burial was not by inhumation, the problem becomes moot for the archaeological record. In some instances cremation was used in the event of special circumstances of death or for individuals of a specific social position (MacLeod 1925:129-130; Voegelin 1944:354-

355). Scaffolding or tree burial also occurs as the primary method for some settled groups (Bushnell 1927:65-69). Even among the Mandan, however, the scaffolded individuals were eventually buried, except for their skulls (Bushnell 1927:68; Weitzner 1979:287, note 3). These practices indicate that secondary burials cannot casually and unequivocally be used as evidence of the frequency of deaths which occurred away from a settlement. Furthermore, we must evaluate the possibility that only individuals of specific status or office were given secondary burial and not assume that all such burials represent individuals who died far from the preferred final burial location. These complicating factors, I believe, in many cases may be evaluated.

A second factor pertains to technological problems confronted when burial in the ground is preferred, but when the ground is deeply frozen. This is generally not a problem except for groups who lived beyond about 40 degrees north latitude (or at high elevations), where extended winters resulted in a limited ability to dig graves for weeks or months at a time. This factor may explain, in part, why temporary scaffolding was significantly more common among groups in the Great Lakes regions than those further south (Voegelin 1944:356, Table 12). For the Ojibway, temporary winter scaffolding or tree burial is well documented (Griffin 1930:39-40; Jones 1869:98; Voegelin 1944:358). Jenness (1935:105) provides this discussion,

> With the primitive tools at the command of the Indians the digging of a grave in frozen ground was well-nigh impossible. Hence during the winter months they merely laid the corpse on the surface of the ground, wrapped it

> in birch bark, and covered it with logs or stones . . . . Even commoner than surface burial was the deposition of corpses in trees. Nevertheless, both surface and tree burial were no more than substitutes for burial in the ground. Indeed, relatives often returned after the snow had melted to inter the remains they had left exposed to the elements.

Similar accounts are available for the Winnebago (Griffin 1930:24-25; Lawson 1907:127; Schoolcraft 1855), some Eskimo groups (Boas 1964:203), and others. In the Plains region, scaffold or tree burial was most common among groups living in the northern Plains and Rocky Mountains (Bushnell 1927; O'Shea 1984). Among the Caddoan speakers, for example, only the Arikara commonly used scaffold burial, the more southerly Pawnee and Wichita used primary inhumation as the normal disposal mode. Use of scaffolding by the Arikara came after contact with the Mandan, when they were at the extreme <u>northern</u> end of their range, and then it was apparently done primarily in winter (Orser 1980a, 1980b:143-145, 1980c:49; Ubelaker and Willey 1978). For groups living in tropical and lower temperate zones at low elevations, frozen ground would not have presented a problem and cannot be used to account for the presence of secondary burial. Similar environmental limitations should be taken into account in distributional studies of tree burial and scaffold burial (e.g., Davidson 1949). We would not expect such disposal in regions lacking trees or materials suitable for building scaffolds.

The kinds of corpse treatment illustrated by the above accounts indicate that a general pattern may result from logistical mobility, that is, situations where groups operate out of a permanent settlement for an extended period. When a death occurs during the

course of activities conducted away from a camp or settlement, there is a widespread practice of reducing the remains through cremation or temporary scaffolding and then transporting them to a preferred site for secondary burial. We might predict from this that the degree of logistical mobility, measured as the length of time x number (or percent) of the individuals of a community spend away from the settlement or base camp, will be correlated with the frequency of secondary burial. It is necessary, obviously, to also take into account secondary burial for special status individuals, whose status may (hopefully) be indicated by other specific burial traits or associations. Also, in colder regions, the frozen ground problem must be contended with. Other things being equal, however, for groups in warm climates we can extend the above prediction by suggesting that hunter-gatherer groups which vary seasonally, operating out of habitation sites as logistically mobile collectors in some seasons but as residentially mobile dispersed foragers in others, may also be expected to exhibit secondary burials proportional to the period of each year spent away from seasonally permanent habitation sites.

Different kinds of mobility and organization will significantly influence the nature of burial distributions, the composition of interments, and the presence or absence of cemeteries as well as their location (R. Chapman 1981; Saxe and Gall 1977). This statement by Leshnik (1972:151) concerning a pastoral group

illustrates some aspects of this proposition.

> It need hardly be remarked that the usual techniques of settlement archaeology have only limited application when nomads are the object of investigation. But sometimes their burials, laid out in cemeteries, can be identified. The location of such cemeteries relates directly to the regular migration route. I once came upon a small graveyard on a mountain-side in the Hindu Kush range which upon inquiry proved to belong to Pasthun nomads, whose route passed the site. I was further told that in fact they had two main burial places, one at each end of their route. Whenever possible the burial of a member of the group who had died on the way would be postponed until the cemetery in the direction of travel had been reached. But if the migration route is a long one, secondary cemeteries might be established at intermediate points. It would 'in practice' be exceedingly difficult to reconstruct migration routes on the evidence of such cemeteries. But at the very least, a knowledge of such practices can help to explain the presence of multiple cemeteries, some of which may be quite small, in remote places.

In contrast to logistically organized groups, we can expect few cemetery areas or burial clusters among foragers leading a residentially mobile existence, when recurrent occupation of residential sites by aggregate groups is not predictable. Burials for these groups will likely be scattered across the landscape in accord with the subsistence group's movements, which are ultimately based on factors such as the periodicity of rainfall or distribution of key resources. Ethnographically, the general absence of cemeteries or consistently used preferred burial sites among foragers is widely documented (Holmberg 1969:232-235; Radcliffe-Brown 1922:107; E. M. Thomas 1958; Roos 1931; Wiessner 1983; Yellen 1976:65; Moore 1979:219). Likewise, formalized secondary burial among such groups is rare (e.g., Taylor 1972), although relatives may

eventually return to bury remains if they had been left exposed in one form or another (Holmberg 1969).

Some residentially mobile foragers have what might be considered a "portable cemetery" system in that they transport selected elements (often the skull, mandible, or long bones) of the recently deceased with them for a period of time (Davidson 1949:76; Haglund 1976b:81 Hiatt 1969:106; Holmberg 1969:235; Moore 1979:298; Radcliffe-Brown 1922:293). I believe this generally happens when there is a preferred final burial location, such as the totemic ground of a lineage (e.g., Davidson 1949:78; McWilliam 1936:40; Moore 1979:299; Thomas 1908:403). A group's expected pattern of movement may dictate some aspects of funeral treatment. If they will return to the vicinity of the death site in the foreseeable future, the remains may be temporally buried or scaffolded. Otherwise cremation may be used to reduce the corpse for transport (Hiatt 1969; Thomas 1908:390,397), or in some cases (especially for children or infants) the bones may be bundled, or the corpse mummified and carried to the proper place (Abbie 1969:161; Thomas 1908).

In Woodburn's (1982) study of death among four African hunter-gatherer societies, he indicates a relationship between different economic organizations (immediate-return versus delayed-return hunter-gatherers) and burial practices.

> In general terms it can be said that hunters and gatherers with relatively simple death beliefs and practices are those with what I have defined elsewhere as immediate-return rather than delayed-return economies, social organisations and values. Within delayed-return systems elaborate mortuary ritual and formal mourning are most

> stressed when an officeholder, particularly an important officeholder, dies and least stressed when a small child who holds no office or no property dies. (Woodburn 1982:205-206)

Likewise, the importance of cemeteries and burial to aggregate group rituals apparently depends upon the organization of group and on the temporal and spatial predictability of economic resources. As hypothesized by Saxe,

> To the degree that corporate group rights to use and/or control crucial but restricted resources are attained and/or legitimized by means of lineal descent from the dead (i.e., lineal ties to ancestors), such groups will maintain formal disposal of their dead, and conversely. (Saxe and Gall 1977:75)

In general, we see that recurrently used formal cemeteries first occur in association with relatively fixed and reliable resources such as shell fish, key game crossings, or anadromous fish runs (Saxe 1971; R. Chapman 1981:74-77). It is in these contexts that we find the earliest large cemetery sites in Australia (Haglund 1976a, 1976b), the Old World (Albrethsen and Brinch Petersen 1976; R. Chapman 1981; P. E. L. Smith 1982:376), and in North America (Tuck 1976; Claflin 1931; Lewis and Lewis 1961; Walthall 1980).

Even with this brief background we can argue that the type of corpse disposal and occurrence of small cemeteries, or sites of repeated burial, are factors closely linked with the overall organization of hunter-gatherer groups. The selective practice of secondary burial and existence of numerous burials at a single site appear to be consistent with groups that are logistically organized collectors or delayed-return hunter-gatherers for some significant

portion of the year. Furthermore, the frequency of secondary burial may be closely correlated with the extent of logistical mobility and the proportion of the annual cycle spent away from primary base camps or habitation sites. Conversely, a general lack of preferred burial sites is more likely for groups of immediate-return foragers lacking long term base settlements and fixed or predictable aggregation sites.

# V. RESOURCE FIXITY, MOBILITY, AND MORTUARY VARIABILITY: AN EXPLANATORY MODEL

> Models are usually idealized representations of observations . . . they simplify, . . . and they offer a partially accurate predictive framework . . . . It is particularly important to realize that since models mirror only selected aspects of the observations then it is both possible, permissible and desirable to have more than one model of different aspects of a single situation . . . where a trivial observation under one model may become a central factor under another. (Clarke 1972:2,4)

Given the postulated relationship between hunter-gatherer burial programs and group organizational variability as discussed in Section IV, an initial formulation of an explanatory model which specifies the nature of this expected relationship is provided. By definition, a model is a simplified reconstruction, idealized representation, or a stylized version of some desired end product or an ultimate reality. Models are necessarily incomplete or scaled-down versions of entities or organizations, otherwise they would be the reality they are intended to represent rather than a simplified map or representation of it (e. g. Osborn 1985:123). Models are useful to the extent that they enhance perception and evaluation of ideas, and help isolate cases which do not conform to expectations. This may lead ultimately to more comprehensive (not necessarily more complex), more accurate, or supplementary explanatory models of the phenomena of interest.

The model outlined here is a generalized version of one initially developed for the interpretation of Archaic burial variability in the Middle South riverine area of eastern North America (Hofman 1985a, 1985b). The model presented here should be seen as supplemental to, not an alternative or replacement for, the G+A+S (gender, age, and status) model which is generally used in the interpretation of mortuary remains from archaeological contexts. For hunter-gatherers, I believe we can make the model more appropriate and complete by adding variables for resource fixity, organizational variability, and circumstances of death, such that the model might be capsulized as follows:

Mortuary Variability (V)=G+A+S+R+O+C

where G represents gender, A age, S status, R resource fixity, O organizational variability, and C the specific circumstances at the time of death. These variables are not completely independent, and so are not truly additive (or multiplicative). The amount of variable interaction could theoretically be evaluated in the event of actual applications of analysis of variance based on numerical estimates of the parameters.

Resource fixity refers to the spatial stability and temporal (seasonal) predictability of key economic resources. Organizational variables reflect changes in group size and composition due to aggregation, logistical movements, and other actions of the group during its pattern of long term land use. Situational circumstances at the time of death include factors such as frozen ground, availability of trees or scaffold material, and specific "cause" of

death (e.g., lightning, sorcery, etc.). The importance of situational circumstances has previously been indicated (Binford 1971; Griffin 1930; Ucko 1969), but has been given limited consideration in archaeological mortuary studies.

The relative degree of mobility will be determined by the importance of R and O in the model. For fully sedentary societies we could for most practical purposes drop mobility as a pertinent factor: with the exception of logistical excursions such as long-distance procurement, hunting, trading, and raiding. These factors will vary widely between groups and within groups during different seasons. For hunter-gatherer societies, however, we should not assume a priori that mobility is or is not important, but instead should address the mobility and organizational variability problem with independent evaluations for each case.

With these general considerations in mind, several critical assumptions pertinent to this model can be advanced. First, hunter-gatherer societies relying upon resources which are seasonally variable in productivity and place of occurrence will typically exhibit cyclical variation in group organization, including periods of aggregation (maxiband or reproductive group) and periods of fission or dispersal (miniband or subsistence group). These aggregations will correlate with periods of resource fixity; that is, when important or key species occur in spatial and temporal contexts which are reasonably predictable. Ethnographic documentation of seasonal variation in group composition and subsistence is commonplace, and such variability is generally referable to

fluctuations in the temporal and spatial availability of key resources (e.g., Damas 1968; Harris 1977; Hayden 1981; Silberbauer 1981). Aggregations may also occur as a result of periodic, but spatially and temporally unpredictable resource windfalls. In these circumstances of group fusion, rituals may occur, but if these are the only kinds of aggregations, preferred burial sites will likely not be associated with them. Ancestral totemic grounds may provide fixed ceremonial sites when resource fixity is not adequate to enable predictable ceremonial places and times (e.g., Davidson 1949:78,96). Such sites are not likely to be the scene of recurrent aggregations unless they are in the vicinity of predictable and useful or otherwise productive resources.

A second assumption is that important rituals including rites of passage will typically be conducted during aggregations when the largest portion of the lineage or reproductive group is congregated. Ethnographic examples of such behavior are very common and reflect the importance of these rituals for group solidarity, education, continuity and integration. They also provide an important scenario for archaeological consideration (Conkey 1980; Gorman 1972; Lee 1979; Spencer and Gillan 1899; Wilmsen 1974; Woodburn 1968).

Thirdly, hunter-gatherers occupying environmentally or socially circumscribed resource territories with at least a seasonally high degree of resource fixity and logistical organization will establish preferred or recurrently used locations for aggregations and, as a result, preferred locations for rituals such as the final burial or treatment of the dead. This assumption must

be qualified by noting that; (1) long term land use patterns and the nature of group mobility will influence the potential number of preferred burial locations, (2) extenuating circumstances at death, such as hostile intergroup contacts, may preclude or redirect preferred treatment of the deceased, and (3) the effort expended to expedite the preferred burial arrangement may vary depending on the individual's position in the society or maxiband (e.g., infants and senile individuals may be deposed of without aggregate activities). Ethnographically recorded preferences of some hunter-gatherer societies for specific burial locations occur (Davidson 1949; Gould 1963; MacLeod 1925; Laughlin 1980), and archaeological evidence for concentrations of hunter-gatherer burials at selected sites and specific kinds of sites, such as rockshelters and shell middens, are widely documented.

Finally, it is argued that free wandering foragers (e.g., early Paleoindians in the New World) and foragers relying on spatially and temporally unpredictable, non-fixed, or fairly evenly dispersed resources, and without fixed aggregation sites, will generally lack preferred or consistently reused burial places.

Given the above stated assumptions, the linkage between mortuary practices and mobility can be viewed as the result of logistical and timing problems. Getting the remains of the deceased to an appropriate place at the appropriate time will require, in some instances, postponement of final interment and a means for preserving and curating the remains. In this context, the mortuary activities may reflect technological problems (Binford 1971; Radcliffe-Brown

1952) and situational circumstances which require that preferred or standard ritual aspects be altered, and that a secondary funerary program be implemented.

Given a fixed number of preferred burial locations, the key ones of which are usually at or near seasonal aggregation sites, there will be intervals when the deceased will be (a) some distance removed from a preferred burial location and/or (b) some time away from the next aggregation or preferred burial time. In the event of such an untimely death, perhaps a considerable distance from a preferred burial location or several weeks or months prior to an aggregate gathering, one of several funerary options could have been selected. Inhumation or other treatment at a secondary (less preferred) site may have been expedient and practical, but would have depended upon the status, social, and familial relationships of the deceased, as well as the importance of funerary rituals to the social group as a whole (Binford 1971; Radcliffe-Brown 1952). Alternatively, temporary burial, scaffolding, or tree burial may have been practiced with the bundled bones or reduced remains eventually redeposited at a preferred location following the appropriate ritual activities.

Cremation is another method which would have made possible the transport of remains and their eventual burial at a preferred place and time. The practicality of such methods would depend on such factors as season, length of time until final interment, direction or pattern of movement (e.g., toward or away from an aggregation site), distance of movement, fuel availability, and so forth. Expending the extra effort involved in various secondary burial procedures may have

been more common when individuals of relatively high status, or persons with numerous family and social ties were involved. It is critical to realize, however, that among mobile groups the additional energy expended for secondary burial could reflect situational circumstances at the time of death rather than a difference in social status of the deceased.

Seasonal factors may also influence the frequency of various secondary burial types employed in given situations. For example, if a group is dispersed during the winter and will not move to the aggregation and preferred burial site until spring, cremation might be preferable to bundle burial. This is because deterioration of the body due to natural processes and microorganisms is retarded in the cool winter weather and the corpse might not be ready for transport (i.e., fully decayed) by spring. This problem could be circumvented by cremation, especially if death occurred too close to the time of transport to allow complete maceration. If a death occurred during summer, however, and at a considerable time prior to aggregation, then scaffolding or tree burial may have been a more viable option.

Another factor which may influence the frequency of burial types is seasonal fluctuation in economic stress. If, as a case in point, stress was most severe during late winter, we might then expect a higher average frequency of deaths during this season than during any other. In this situation, if winter was a time of group fission, we might expect a relatively high frequency of secondary cremations at springtime aggregation sites. If, on the other hand, winter was a period of aggregation, we would expect a relatively

higher frequency of primary inhumations at wintertime aggregation sites. Factors such as frozen ground, however, may inhibit inhumation.

The sex and age composition of secondary burials can also be expected to vary depending on whether groups operate as residentially mobile units or rely primarily upon logistical mobility. For logistically mobile organizations, primarily those individuals involved in long distance trading, raiding, and hunting would be expected to occur in cemeteries as secondary burials. This is due to the increased likelihood of such individuals dying at a considerable distance from habitation sites. Differential status may be associated with individuals involved in such activities. Active adult males may be over-represented in the secondary burials of such groups. In contrast, residentially mobile groups which aggregate for a short portion of the year, we might expect a more representative cross section of the population to occur as secondary burials.

For hunter-gatherers, the types, varieties, and quantities of burial associations may reflect status or position of the individual, sex, prosperity of the family, or specific social bonds. The mode of burial, however, may often reflect, primarily or in part, the situation of the hunter-gatherer group at the time of an individual's demise.

Given the above discussion, it is possible to make some predictions about the relationships between mortuary processes and organizational aspects of mobile hunter-gatherer groups. Evaluation of these ideas will depend in large part on use of the archaeological

record. Archaeologically, then, the central postulate is that, other things being equal, the ratio of secondary to primary burials at hunter-gatherer aggregation sites, or preferred burial sites, may provide a relative indicator of the proportion of each year the reproductive group, or some portion thereof, spends away from such aggregation sites. Logistically mobile collectors will utilize preferred burial locations with an intensity proportional to the duration of occupation at permanent habitation sites. And, the proportion of secondary burials will be highly correlated with the degree of logistical mobility.

"Other things" are, of course, never equal. As a result there is a plethora of variables which could influence funerary treatment. The contention here is that these "other" factors are significantly interrelated with resource fixity, group organization, and mobility, and that they will be of statistical relevance (Salmon and Salmon 1979) to the explanation of variation in hunter-gatherer mortuary practices. Given one or more fixed sites of predictable recurrent occupation, then the more mobile the group and the more time spent as fissioned subsistence groups or minibands, the greater the likelihood that secondary burials will be a necessary treatment and so represented in the "cemetery" at an aggregation site.

Among the more important factors which would influence the actual number of secondary burials in specific situations are the following.

1. The percentage of the year spent at aggregation sites or near preferred burial sites.

2. The importance of resource fixity and/or storage options to group organization and economy.
3. The number and distribution of preferred burial locations or semi-permanent habitation sites.
4. Size of the economic territory and average distance of individuals from preferred burial sites during group fission. Once aggregation sites are established, the proportion of secondary burials should also decrease as territory size decreases.
5. The seasons of aggregate occupation at or near preferred burial locations. Differential stress due to patterned seasonal variability in subsistence and health may affect the likelihood of deaths occurring in the vicinity of preferred locations.
6. The periodicity and predictability of aggregations. This should correlate with the degree to which economic activities are seasonally focused in specific locales.
7. The amount of group and individual time spent in transit or away from aggregation sites, and the patterning of such movement.
8. Secondary burial may also represent a status marker or be used to codify certain social positions of the deceased. This is historically documented among agricultural groups such as the Choctaw (Brown 1971b).

This last factor is potentially a major problem for the interpretation of secondary burials using this model. There are, however, two things which indicate that it is still tenable to operationalize the model. First, hunter-gatherer secondary burial, as opposed to its occurrence among sedentary groups, can be shown ethnographically to commonly be associated with mobility and transport variables. Secondly, if secondary burial is reserved for elites in specific hunter-gatherer societies, then it should correlate with differential funerary offerings or other attributes so the problem can, to some extent, be evaluated independently.

Given these assumptions and expectations as to the potential relationships between the organization of hunter-gatherer societies and funeral practices, it is important to reevaluate these considerations with regard to their potential occurrence in the archaeological record. In general, it is impractical to evaluate these notions using contemporary ethnographic information. As seen in the previous chapter, most available ethnographic documents are inadequate for evaluating overall mortuary practices of hunter-gatherer groups. Taken on a large enough scale patterns are discernible, but an adequate evaluation of the ideas outlined here is more likely to come from broad scale study of the archaeological record. Even given severe limitations, information pertaining to final disposal of the dead among many hunter-gatherer groups is much more complete in the archaeological record than in the ethnographic literature. We must, however, carefully consider the specific restraints and limitations of archaeological observations for evaluating mortuary practices (O'Shea 1984).

# VI. CONFRONTING THE ARCHAEOLOGICAL RECORD

> With the enormous time depth of the archaeological record we can consider many problems and changes which are not observable in the ethnographic present. (R. Chapman 1981:81)

Defining patterns in, and expectations about, the ethnographic data on hunter-gatherer funerary practices is of little use to archaeological research until we translate those expectations into the language of static residues of the archaeological record. Initially, it is the material correlates of behavioral activities which are of concern (Peebles and Kus 1977; Smiley et al. 1980; Wyckoff and Baugh 1980). Then, it is a matter of accounting for preservation and transformations of those materials (Schiffer 1983; Wood and Johnson 1978). Finally, recovery and sampling through archaeological investigations are major contributing factors to what the archaeological record will look like when analytical studies begin (Binford 1964, 1975, 1983c; Buikstra 1976; Mueller 1975). The ability to recognize and realistically interpret patterning, variability, and the specific nature of mortuary events depends on all the above.

This section is to provide a linkage between expectations about hunter-gatherer mortuary activity in various behavioral situations and the limited residues of these behaviors in the transformed and sampled archaeological domain. We have to contend with trying to link past unobservable cultural behaviors, with the contemporary static remains (Binford 1977). The material correlates

of funeral practices, in the event of burial and "good" conditions, may include remains of the deceased, a burial feature, and possibly associations. The recognition and recovery of these various components depends on a variety of factors as discussed by O'Shea (1984:23-49), and others (R. Chapman and Randsborg 1981:10-14).

Differential preservation of the remains of the body is a central factor in archaeological recognition, recovery, and interpretive potential. Extremes range from various states of mummification (e.g., Bushnell 1920; Fowke 1922; Harrington 1960; Robbins 1974), to complete loss of bone and all organic remains (Biek 1963). Preservation is highly correlated with exposure, moisture variation, and soil acidity. Biek (1963:181-185) found that for Bronze age burials in Britain, bone preservation was not likely in soils with a pH of 5.6 or less, and Gordon and Buikstra (1981) have shown a general correlation between decreasing soil pH and decreasing preservation of bone. The latter study has also documented the differential preservation of skeletal elements of individuals of different ages. Immature bones are simply not as durable. Knowledge of soil conditions is important, otherwise it would not be as feasible to determine whether burials would be preserved and recoverable at a particular site, even if they had originally been present.

Associations or offerings interred with burials are likewise of variable durability. This differential preservation results in a leveling (reduction) of diversity or complexity which can be observed in the archaeological record (O'Shea 1984). Investigations of

archaeological correlates of differential mortuary treatment due to factors of age, sex, and status are generally hampered by the necessity of relying on non-perishable or relatively durable remains. Many vertical or horizontal social distinctions might be expressed at the time of burial through the use of decay-prone items which will generally not be visible archaeologically. Archaeological remains almost always represent a limited subset of the associations originally placed with the deceased. Therefore, while we can often determine which individuals definitely did have grave associations, we generally cannot determine which individuals definitely did not. The recognition of burial features or containers depends largely upon their original form, nature of the surrounding matrix, and processes which act upon the feature after construction or burial.

As with any use of archaeological remains, sampling is an ever-present problem in contending with diversity and patterning in mortuary samples. Often a small or unknown proportion of a cemetery is excavated and the representativeness cannot be evaluated. Furthermore, differential placement of individuals, multiple disposal modes, and multiple cemeteries confound the issue. Even complete excavation of a defined cemetery will not insure that all burials have been identified at a given site. Furthermore, especially for complex societies, seasonally mobile groups, and many hunter-gatherers, the use of multiple burial sites is common. Multi-staged burial programs and multiple locations for appropriate burial are factors which require that a regional approach be taken in the analysis of mortuary remains, especially for hunter-gatherers

(Buikstra 1976, 1981; Charles and Buikstra 1983). It is simply not realistic to evaluate the overall burial program of a past hunter-gatherer group based on a small sample of burials from a single site. The combined use of burial remains from multiple sites of the same cultural tradition is necessary to gain an overall picture of mortuary patterning. This is especially critical when we consider the large size of resource areas which are commonly exploited by hunter-gatherers (Binford 1983a, 1983c; Hitchcock 1982: Table 11.4).

In this investigation, a central problem in confronting the archaeological record concerns the distinction between primary and secondary burials and the consistent recognition of the latter. There are two basic categories of secondary burials of interest here: (1) bundle burials or other secondary depositions of skeletal elements after a period of exposure or primary burial, and (2) secondary cremation, the deposition of cremated remains in a location other than where they were originally burned. I will consider aspects of these two categories of secondary burial in turn, as pertains to the archaeological recovery and recognition of each.

## The Problem with Bundle Burials

The identification of burials as secondary or primary takes on significance in any attempt to use or evaluate the model proposed above. One aspect of this problem is in distinguishing primary interments which are flexed from secondary burials which may appear, in the archaeological context, very similar to flexed primary burials. In some situations, it is fairly easy to determine that

specific burials represent secondary deposits. The tightly clustered occurrences of stacked disarticulated elements, often with minor elements missing, or burials with major elements missing (or burials consisting of only a few major elements) can easily be recognized when preservation is good. If defleshing or cutting of tendons was part of the burial procedure, this may also be recognizable (e. g. Bass and Phenice 1975; Ubelaker 1978). Other potential indicators include the remains of seasonally active insects, such as fly pupae and beetle exoskeletons which can indicate exposure of a corpse and may be recoverable in some archaeological situations (Gilbert and Bass 1967; Rodriguez and Bass 1983; Ubelaker and Willey 1978).

Secondary bundle burials may pass through a variety of possible stages, each lasting a variable length of time, before reaching the archaeological context. These possibilities include scaffold or tree burial, temporary interment in the ground, defleshing, "continuous" transport, and combinations of these. Individuals might be tightly bound or put in a restrictive container such as a skin or woven bag at the time of death. Otherwise, bundling of the elements would require exposure until decomposition was well along, or else intentional cutting of ligaments would be necessary.

There are many instances in the archaeological record where specific burials cannot unequivocally be interpreted as either primary or secondary. Tightly flexed cases may represent either individuals who were bound soon after death and buried immediately (primary burial), or considerably later (secondary burial). Also,

burial of individuals in flexed positions, especially in the sitting position or flexed on the back rather than on the side, may result in collapse of the skeleton as the grave fill settles and create the appearance of a tightly flexed burial when, in fact, it was not. A basic problem, then, is distinguishing tightly flexed primary burials from secondary bundle burials which are also tightly flexed. For secondary bundle burials, the likelihood that small extremity elements will be missing, due to loss during decomposition, storage, or transport, should be much greater than for primary interments. Given adequate preservation, such a correlation can be investigated. In cases where secondary bundle burials occur in essentially articulated form, such "tightly flexed" secondary burials should exhibit an above average number of missing extremity elements such as phalanges, carpals, tarsals, and patellae.

The problems confronted in attempting to evaluate such a correlation are several. Differential preservation, recovery techniques, and post-depositional processes will consistently bias against recovery of some of these small elements even if detailed skeletal inventories were presented for each burial and allowances were made for preservation and recovery differences between sites. On a site specific level, however, it should be feasible to evaluate the recovery ratio of extremity elements for definite primary burials as a control, and contrast this with the extremity element count for tightly flexed burials which may represent secondary interments. The result should enhance identification of possible secondary bundle

burials and direct more detailed investigation of possible corroborating evidence such as dismemberment marks.

An initial attempt to evaluate this proposed correlation between the degree of flex, measured as illustrated in Ubelaker (1978:15), and frequency of small extremity elements has been with data from the Anderson site, a Middle Archaic shell midden on the Harpeth River in Williamson County, Tennessee (Dowd 1981, 1985; Joerschke 1983; Steverson 1981). The site had over 70 burials with consistent recovery using one-half inch mesh screen. Joerschke inventoried the skeletal elements recovered from each burial (information on file, Department of Anthropology, University of Tennessee, Knoxville). Due to cases of moderate and poor preservation, plow disturbances, coarse screen size, and the potential for post-depositional movements, I did not use phalanges in the extremity counts, because these elements were poorly represented in the entire sample. I selected metatarsals (n=10), metacarpals (n=10), tali (n=2), naviculars (n=2), and patellae (n=2) as small elements which might be susceptible to loss through the various stages of secondary burial, but which are large enough to have been consistently recovered given the field techniques and circumstances of preservation. A burial which had all these elements was given an extremity score of 26, with smaller scores indicating the total number of these elements actually accounted for.

Initially I found a correlation between a low frequency of extremity elements and burials recovered from the plow zone or at the base of the plow zone (Figure 6.1). The number of extremity elements

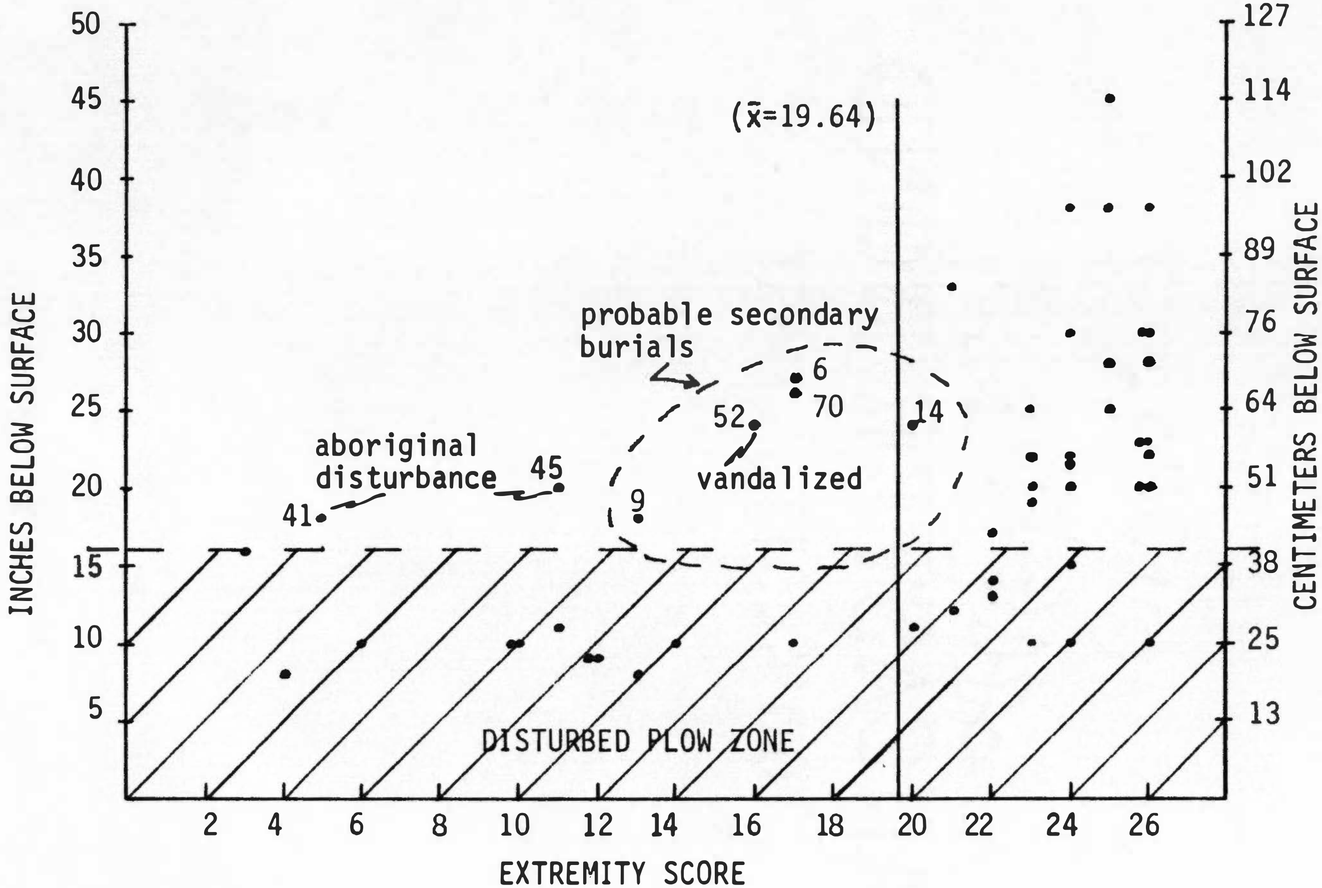



Figure 6.1. Frequency of extremity element occurrence in relation to the plow zone, Anderson site, 40WM9, Tennessee. Each dot represents one burial and selected burial numbers are indicated.

in burials from the plow zone was typically below the mean (Table 6.1). After removing from the sample the plow zone burials, infants (due to poor preservation and limited bone development), and cremations, there remained 30 burials with adequate data to evaluate the extremity score in relation to degree of flex. Flexure was measured to the nearest five degrees using a goniometer. Measurements were taken from field photographs unless the angle was too oblique for an accurate reading, in which case measurements were taken from the field sketches. When both femurs were not at the same angle to the vertebral column, the most extreme femur or largest angle was measured. In cases where the vertebral column was curved, the angle was measured using a line formed by the base of the skull and the sacrum.

The degree of flexure was plotted against the extremity scores for each below-plow-zone burial (Figure 6.2). Tightly flexed individuals with low extremity scores can be isolated as possible secondary bundle burials. There are five burials with below the mean number of extremity bones which are also tightly flexed (angle of flex less than 20 degrees). These five cases are indicated in Figure 6.2. One of these cases, burial 52, had been vandalized which may account for the loss of small elements. Burial 14 was recorded in the field as a possible bundle burial, and the others (burials 6, 9, and 70) remain as likely candidates. Burial 45 has a low extremity score, but was disturbed by an aboriginal pit and so its degree of flexure may also be questionable. Burial 17 has a low extremity score for the angle of flexure, but it is a child's skeleton and

Table 6.1. Crosstabulation of extremity element recovery by strata, Anderson site, 40WM9.

| Stratum | Extremity Score: Below Mean (<19.6) | Above Mean (>19.6) | Totals |
|---|---|---|---|
| Plowzone | o=11<br>e=6.46<br>$X^2$=3.19 | o=8<br>e=12.54<br>$X^2$=1.64 | 19 |
| Below Plowzone | o=6<br>e=10.54<br>$X^2$=1.95 | o=25<br>e=20.46<br>$X^2$=1.00 | 31 |

df=1 $X^2$=7.78 $p < .01$

o=observed value
e=expected value

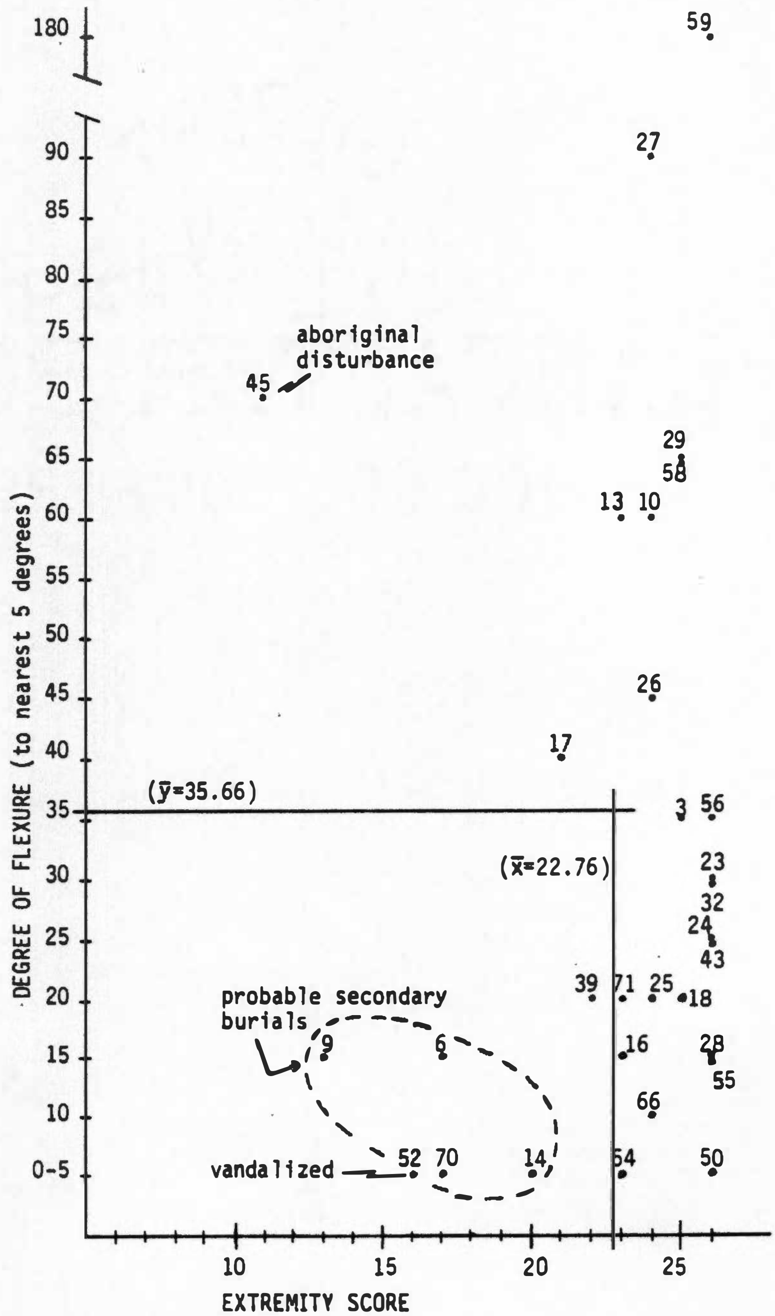



Figure 6.2. Bivariate plot of degree of flexure and extremity score, Anderson site, 40WM9, Tennessee. Infant, cremation, and plowzone burials have been excluded. Each dot represents one burial and burial numbers are indicated.

preservation may be a contributing factor in this case. Burial 39 is also close to the possible bundle burial group, but its low extremity score may relate to its stratigraphic position just slightly below the plow zone.

Several burials, especially 50, 54, and 60, are very tightly flexed or bundled but have all, or nearly all, their extremity elements. This may mean that there was extra care, minimal disturbance, or a short time interval between the time of "bundling" and interment. In general it can be seen (Figure 6.2) that the more open flexed burials consistently have high extremity scores as would be expected. Excluding the vandalized case, there may be at least four secondary bundle burials represented in this sample from the Anderson site (this is 13.33 percent of the below plow zone sample). Other examples may be present in the sample from the plow zone or by the tightly flexed cases with high extremity scores.

This kind of analysis cannot absolutely identify all secondary burials. There may be some cases of secondary bundles which have lost none of the extremity elements. Also, missing elements from primary interments may result from various other factors or processes. In general, however, this kind of approach should enable a critical assessment of the minimal number of secondary "tightly flexed" burials which are represented at a site. The tendency will probably always be to underestimate the actual number of secondary bundle burials which are represented. Minimally, this kind of approach may serve to isolate burials which could represent secondary bundle burials and which deserve closer inspection for evidence of

such treatment. At the very least, It should be possible to determine the relative frequency of secondary burials at sites, even if the actual number of such interments is consistently underestimated. Creating a specific need for ascertaining whether burials are primary or secondary will, hopefully, lead to closer inspection and evaluations by those excavating and analyzing materials in the future.

## The Trouble with Cremations

Several factors have contributed to the relatively infrequent documentation and reporting of Archaic cremation burials in the Middle South and Midwest United States. Primary among these are (1) the relatively unusual or "unexpected" nature of cremations in the region as compared to other more commonly encountered burial types such as primary flexed interments; (2) the small size, and often unidentifiable nature, of most burned bone fragments which result from intentional cremation; (3) the relatively coarse recovery techniques which have traditionally been used in the excavation of sites, such as middens, where burials are commonly found; and (4), the common occurrence of non-human animal bone in the fill of cremation burials which can further camouflage the true nature of these deposits. Because of the fragmented and equivocal nature of cremation remains (e.g., Buikstra and Goldstein 1973; Van Vark 1974, 1975), they have often been regarded as having little information potential and are commonly given short shrift. A pertinent example of this problem is with the Eva site where two or perhaps three

cremations were recorded during the field work (Magennis 1977), but the remains were of little use for metric and morphological analyses of the skeletal sample and so are not mentioned in the published report (Lewis and Lewis 1961).

It is also fairly common for investigators not to expect cremation burials, given their relatively infrequent occurrence in the region. This, in combination with the greater problems in recognizing cremations, has probably contributed to their uncommon documentation in the Middle South. An example of this problem is evident in the following comments by Dunnell (1972:44-45,68) which pertain to faunal material recovered from medium-sized hemispherical pits or "earth oven" features of the Sim's Creek component at the Pi-7 site in the Fishtrap Reservoir area of eastern Kentucky.

> Calcined bones are also present in small quantities in the earth ovens and three species have been identified: . . . deer; . . . box turtle; and <u>Homo sapiens</u>. The human remains were treated in the <u>same manner</u> as the other animals and, in fact, occurred with both deer and turtle in the same earth oven. These circumstances, in the absence of any special treatment of the human bone, provide us with about as reliable evidence for cannibalism as can be expected from archaeological data.
> . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
> . . . certainly <u>Odocoileus</u>, <u>Terrapene</u>, and <u>Homo</u> were hunted . . . .
> . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
> Man himself appears in the diet of the Sim's Creek people, for human bones have been recovered along with those of deer and turtle from earth ovens.

There are a number of problems which make it impossible to objectively evaluate Dunnell's suggestion. He does not provide information on how many co-occurrences of human and animal bone are represented, whether there is evidence of in situ burning, how much

and what portions of the skeleton are represented, what kind of recovery was employed, and so forth. Deer and turtle are both species which occur repeatedly with cremations in the Middle South and the Northeast (see discussion below), so their occurrence with burned human remains is not in itself ample evidence of cannibalism. The use of an abandoned pit or oven feature for a grave might also be expected. Furthermore, there is no practical reason to burn animal portions intended for food to the point of calcining the bone. The bone could, of course, have been burned at a later time. The fact that the bones were burned, however, actually holds little relevance to the question of whether the meat from the bones was eaten. The main point to be made here, regardless of whether the Sim's Creek people were cannibals (a notion for which Dunnell has not provided sufficient support), is that no acknowledgment or consideration was given to the alternative possibility that the remains of cremation processing, or cremation burials, may be represented. This is one of numerous examples illustrating the problem of finding in the archaeological record what we want to find, or what is expected.

Parenthetically, it should be noted that cremation can in some situations enhance recognition and recovery of burials. Calcined bone is extremely durable (e.g., Bass 1984), and when cremations are known to occur but bone preservation is otherwise poor, cremation burials may be over-represented in relation to other kinds of burial which do not preserve as well (e.g., Dincauze 1968). This problem of differential preservation is very likely a factor in the eastern

Tennessee Archaic components at the Icehouse Bottom and Iddins sites (J. Chapman 1977, 1981).

We cannot systematically evaluate biases against recording or recognizing cremations in the archaeological record which may have resulted from various excavator's expectations. It is possible, however, to investigate the potential impact of different field techniques to the recovery and recognition of cremations. We can also consider the importance of artifact associations and non-human animal bone as significant factors which may contribute to the problem. First, it is necessary to provide some base line information on cremations and what we might expect to observe in an archaeological situation with relatively good conditions.

I was fortunate to have access to the remains of a modern cremation in the University of Tennessee, Department of Anthropology Osteology Laboratory (Forensic Case 3-84). This cremation facilitated development of some reasonable expectations about the nature of archaeological remains which might occur in a redeposited prehistoric cremation. Several researchers have noted that many prehistoric cremations produce results comparable to those of modern gas crematoriums (Dincauze 1968:40-41; Gejvall 1969; Wells 1960:35-36). It can also be noted that the nature of the bone fragments from this commercial cremation compare very well to most of the fragments from prehistoric cremations of concern here. The evenness of the burning as indicated by the predominantly white to light gray color of the bone is, however, more consistent for the commercial cremation than for some of the archaeological examples. With regard to the

thoroughness of aboriginal cremation in North America, the following pertinent comments were recorded by Ogden (1933) based on an incidence of cremation in 1835 among the Flathead of the Northwest Plateau.

> I perceived the corpse of an Indian . . . . Close to the corpse lay a quantity of dry fir; a wood in its very nature inflammable, and in the present instance rendered so in a tenfold degree by being reduced to thin splinters . . . . The near relations of the deceased now commenced erecting the funeral pyre. This was done by laying alternately transverse layers of the split wood before alluded to, till the pile attained the height of about four feet, being at the same time of a corresponding breadth, and more than six feet in length. On the top of the whole was placed the attenuated corpse to be consumed . . . . During the twenty minutes which had been thus fearfully occupied, the body was consumed to ashes . . . and when the fire was extinct they collected the ashes and unconsumed fragments of bones, which they carefully wrapped up . . . . (Ogden 1933:62-65)

Summary information pertaining to the modern cremation which is used here as a control case is provided in Figure 6.3. A total of 2013.85 grams of calcined bone remained after cremation of a 42.75 kg (95 pound), 150 cm (five foot) individual. This is somewhat more than predicted by previous estimates (e.g., Binford 1963a:189). This weight, however, includes powdery bone meal which would not be recovered or easily recognized as bone in archaeological situations. Some intentional breakage is involved in the reduction of the bone remains in the commercial cremation process. This, however, is not necessarily dissimilar to prehistoric situations where intentional reduction may involve reburning and intentional breakage. Also, natural processes in the soil and during transportation of the

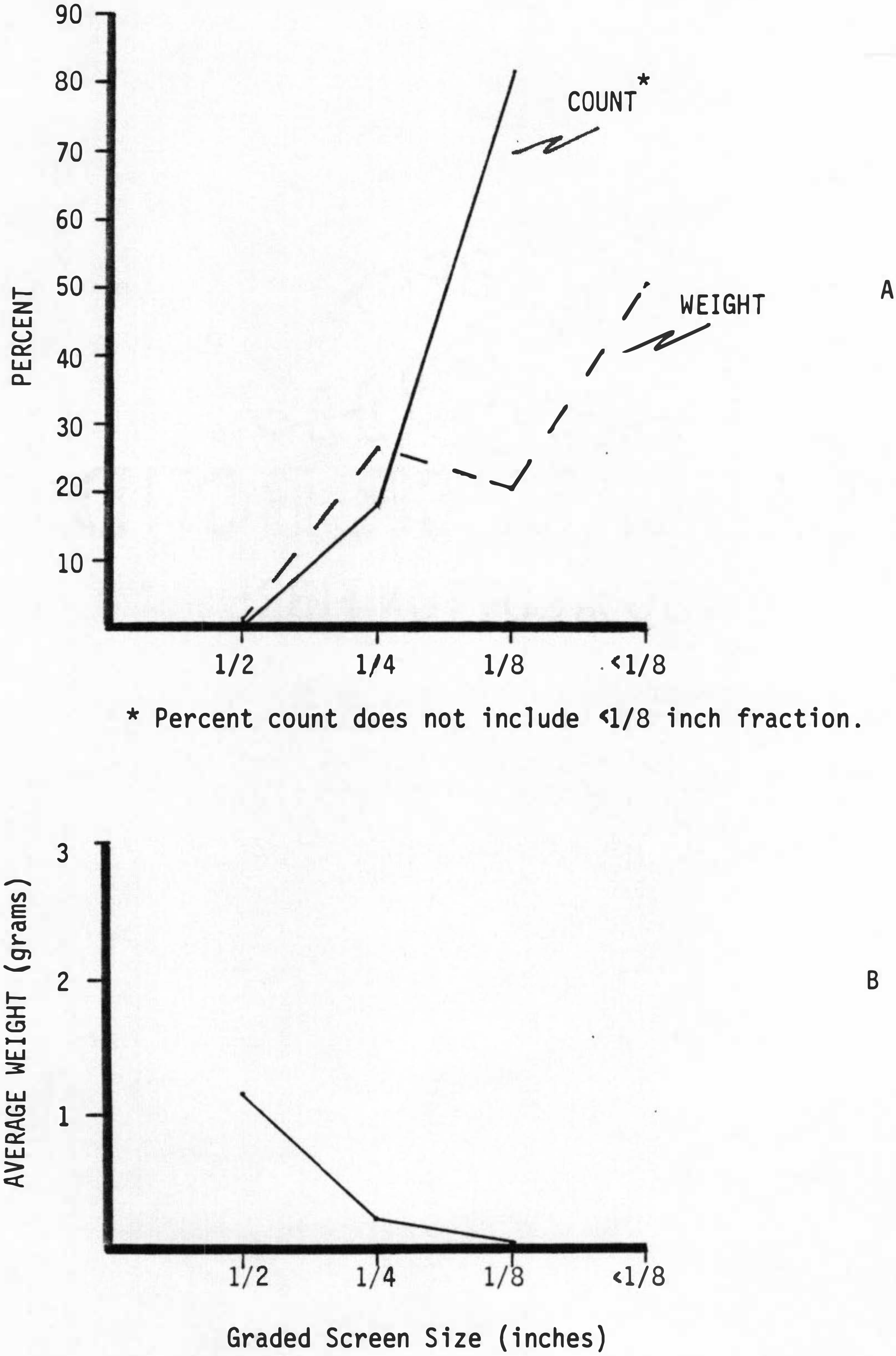



Figure 6.3. Size graded distribution of remains from a modern commercial cremation (U.T. forensic case 3-84). a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

remains may result in fragmentation of the calcined but non-consumed elements which typically are flawed by many incipient fractures.

Figure 6.3b shows the mean weight (taken here as a general indicator of size) of the one-half inch fraction of cremated bone to be 1.16 grams. This measure is based on the total grams divided by the number of pieces in the size grade. This is a slightly smaller mean weight than for the same size fraction from some prehistoric cremations discussed below and probably reflects the intentional reduction of the largest pieces in the crematorium. Calculations for each size grade are based on bone fragments which would not pass through the screen size indicated. Figure 6.3a indicates that the contribution of the one-half inch size fraction to the total count and weight of the cremated remains is very small. This general pattern holds up in the prehistoric cases as reviewed below, except where finer mesh screens were not used (e.g., Anderson, Cherry, and Eva sites). The one-quarter and one-eighth inch fractions consistently contribute a significant portion of the burned remains, when fine recovery techniques are employed.

In the archaeological record, however, the recognition of these small bone fragments, especially those less than one-eighth inch, can be very problematic or highly impractical. About 50 percent (1026 grams) of the modern cremation remains are small enough to pass through a one-eighth inch mesh screen. A significant portion of this material is meal or dust which would be lost even using fine screen recovery or flotation and most would not be recognizable as bone without magnification. Figures 6.4 and 6.5 illustrate cremated


Figure 6.4. Calcined bone from modern commercial cremation. a: Unidentifiable pieces from one-half inch mesh screen. b: Pieces from one-fourth inch mesh screen.

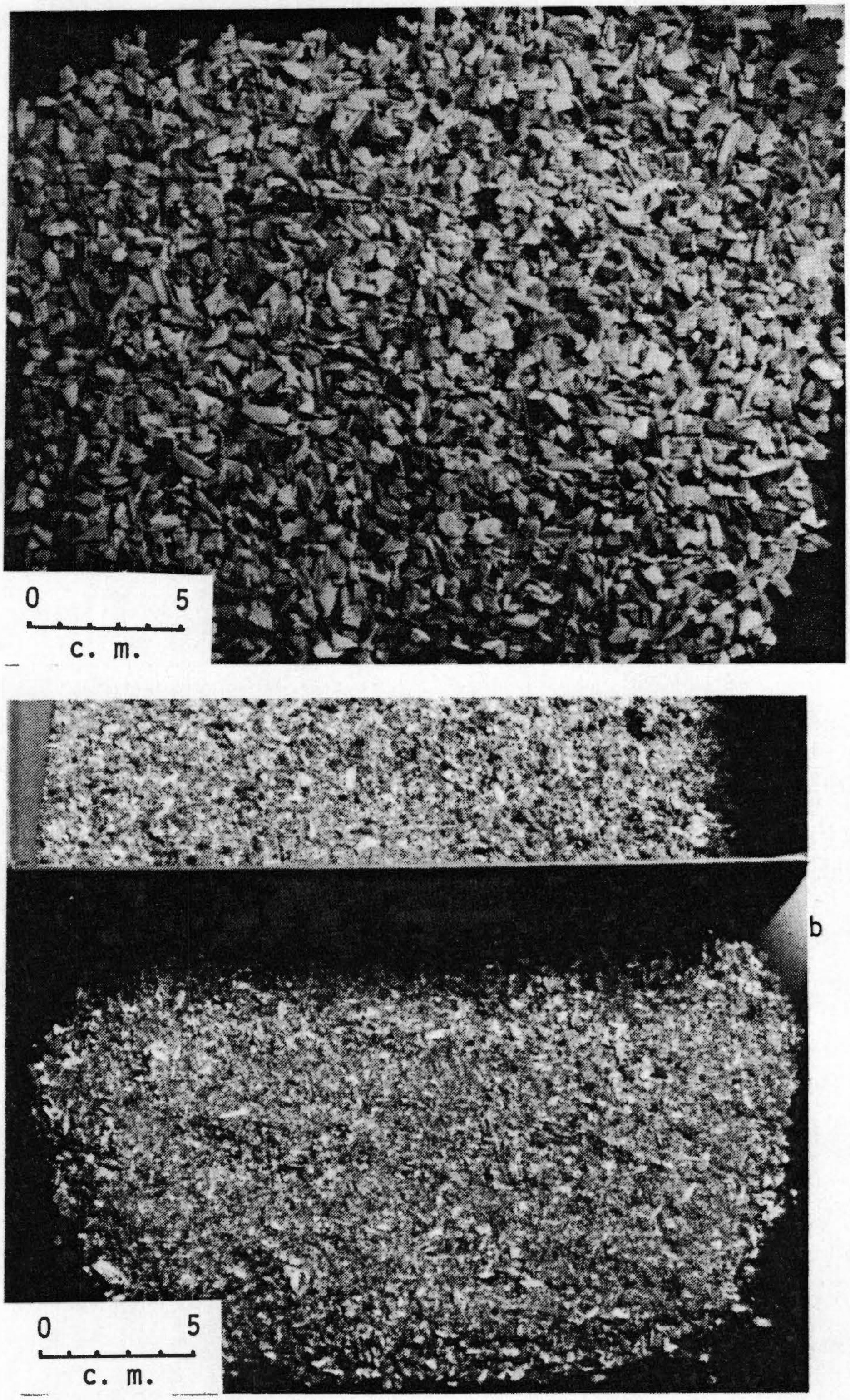



Figure 6.5. Calcined bone from modern commercial cremation. a: Pieces from one-eighth inch mesh screen. b: Pieces less than one-eighth inch in size which constitute approximately half the total weight of the remains.

bone representing these different size fractions. It would require weeks of full-time counting to count just the larger-than-dust particles represented in the less than one-eighth inch fraction. And, recognition of much of the material as bone would be impractical in the archaeological cases. Therefore, counts on the less than one-eighth inch fraction are not provided in the following figures and the count percentages are based only on the largest three size grades (1/2, 1/4, and 1/8 inch).

The frequency of identifiable human elements in this modern cremation case should provide a cautionary note when identification is attempted based on standard archaeological recovery. For the one-half inch size fraction only four items (12 percent) were unequivocally recognizable as human. (This, obviously, is dependent upon the osteological skills of the observers.) For the one-fourth inch screen size grade, only 25 elements (slightly more than one percent) were identifiably human, whereas for the one-eighth inch fraction only 51 items (0.0048 percent, mostly teeth fragments) were unquestionably human. The weight of all identifiable and possibly identifiable human elements constituted only about 1.4 percent of the total weight of the cremation.

It is important to emphasize that while the few one-half inch size grade identifiable bones may be relatively easy to recognize, the likelihood of recovering identifiable pieces is greatly improved if one-fourth and one-eighth inch size material is recovered. This is especially important in archaeological cases where we rarely have access to the total cremated remains to begin with. The higher

frequency of potentially identifiable human pieces coming from the smaller size screens is a pattern that holds up in the archaeological cases as well. In considering these relatively small frequencies of identifiably human remains in this control case, it must be remembered that many archaeological cremations have the confounding factor of non-human animal bone. Such faunal material often includes large mammals such as deer which exhibit many of the same characteristics (in the calcined state), as the human elements.

In the following paragraphs I will consider a series of cremation remains from several sites in Tennessee. These remains have been recovered using various excavation techniques: flotation, fine water screening, one-half inch screening, and no screening. These cases provide an initial base line to evaluate the problems of recognition and recovery of cremation remains in the archaeological record under various circumstances. Using the modern commercial cremation as a control case, it is also possible to isolate cases where more than one individual is probably represented in a cremation, based on weight of recoverable bone. Two basic patterns of bone weight and count distributions are evident, and these correlate with archaeological recovery techniques.

Information pertaining to the Archaic cremations discussed here is provided in Table 6.2. The primary concern in this analysis is with the influence of field methods on recovery and visibility of cremations. Therefore, the proportion of cremated bone recoverable through use of various screen sizes is a key consideration. Cremation burials which were recovered using fine water screening or

Table 6.2. Summary data for selected Archaic cremations from Tennessee.

| Cremation Identification site/feature | Recovery Type | Total Weight (grams) | Total Count >1/8" | 1/2" Count | 1/2" Weight | 1/4" Count | 1/4" Weight | 1/8" Count | 1/8" Weight | <1/8" Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| UT 3-84 (modern) | total | 2013.9 | 12,956 | 33 | 38.15 | 2342 | 537.0 | 10,581 | 412.5 | 1,026.2 |
| Ervin, F.22 | flotation | 609.2 | 2833 | 42 | 89.5 | 711 | 311.4 | 2080 | 197.7 | 10.6 |
| Ervin, F.35 | flotation | 231.7 | 1530 | 9 | 19.8 | 241 | 101.5 | 1279 | 101.7 | 8.7 |
| Ervin, F.36 | flotation | 945.9 | 4736 | 79 | 160.6 | 810 | 340.3 | 3847 | 290.3 | 154.7 |
| Icehouse Bottom F. 583, B.2 | 1/16" | 306.8 | 2752 | 10 | 13.5 | 289 | 86.2 | 2453 | 129.1 | 78.0 |
| Fattybread Area A1, F.1 | 1/16" | 124.2 | 517 | 11 | 34.9 | 94 | 43.3 | 412 | 46.0 | 0 |
| Fattybread Area A3, F.1 | 1/16" | 1887.6 | 9933 | 136 | 260.7 | 1447 | 570.2 | 8350 | 586.2 | 470.6 |
| 40DV34 C.1 | 1.16" | 656.8 | 2463 | 86 | 250.3 | 525 | 249.1 | 1852 | 131.9 | 25.5 |
| 40DV34 C.2 | 1/16" | 204.8 | 1396 | 20 | 34.2 | 236 | 80.0 | 1140 | 71.8 | 18.8 |
| 40DV34 C.3 | 1/16" | 383.0 | 2073 | 44 | 83.3 | 389 | 152.7 | 1640 | 117.2 | 29.8 |
| Anderson B.31 | 1/2" | 574.6 | 292 | 131 | 439.2 | 153 | 134.0 | 8 | 1.4 | 0 |
| Anderson B.53 | 1/2" | 1477.3 | 647 | 413 | 1236.4 | 233 | 240.7 | 1 | 0.2 | 0 |

Table 6.2. (continued)

| Cremation Identification site/feature | Recovery Type | Total Weight (grams) | Total Count >1/8" | 1/2" Count | 1/2" Weight | 1/4" Count | 1/4" Weight | 1/8" Count | 1/8" Weight | <1/8" Weight |
|---|---|---|---|---|---|---|---|---|---|---|
| Anderson B.73 | 1/2" | 380 | 157 | 75 | 267.8 | 80 | 111.9 | 2 | 0.3 | 0 |
| Eva B. 34 | no screen | 115.8 | 34 | 23 | 107.6 | 10 | 7.9 | 1 | 0.3 | 0 |
| Eva B. 47 | no screen | 204.2 | 122 | 73 | 186.1 | 29 | 16.9 | 20 | 1.2 | 0 |
| Cherry B. 51 | no screen | 70.7 | 74 | 18 | 34.9 | 45 | 34 | 11 | 1.8 | 0 |

flotation are considered first, and then contrasted to those cases with coarser recovery. The general pattern of identifiable bone distribution by size grade for cremations recovered using one-sixteenth inch mesh water screening and for those processed by flotation is similar, and compares well to the modern control case.

Three cremations from the Ervin site (Hofman 1985a) were processed by flotation and each exhibits similar size and weight distributions of cremated bone fragments (Figures 6.6--6.8). As with the modern cremation, the one-half inch fraction contributes only a minor percentage of the total weight and count for these three cremations. Because many of the one-half inch fraction pieces are unidentifiable long bone shaft fragments or non-diagnostic portions of crania, most of the identifiably human pieces come from the one-fourth to one-eighth inch fractions. The only significant proportional difference between the Ervin examples and the modern cremation occurs with the less than one-eighth inch fraction. In the modern case, all the remains from this smallest size fraction are accounted for and these represent about 50 percent of the total by weight. For the archaeological cases, most of this smallest fraction is not accounted for and contributes only a minor percentage of the total weight. For most practical purposes, the less than one-eighth inch size fraction and certainly the less than one-sixteenth inch fraction is of little archaeological use for identifying cremations.

The distribution of cremated remains across the larger size grades is, however, of particular interest. For the Ervin cases there is a consistent and dramatic increase in the number of pieces

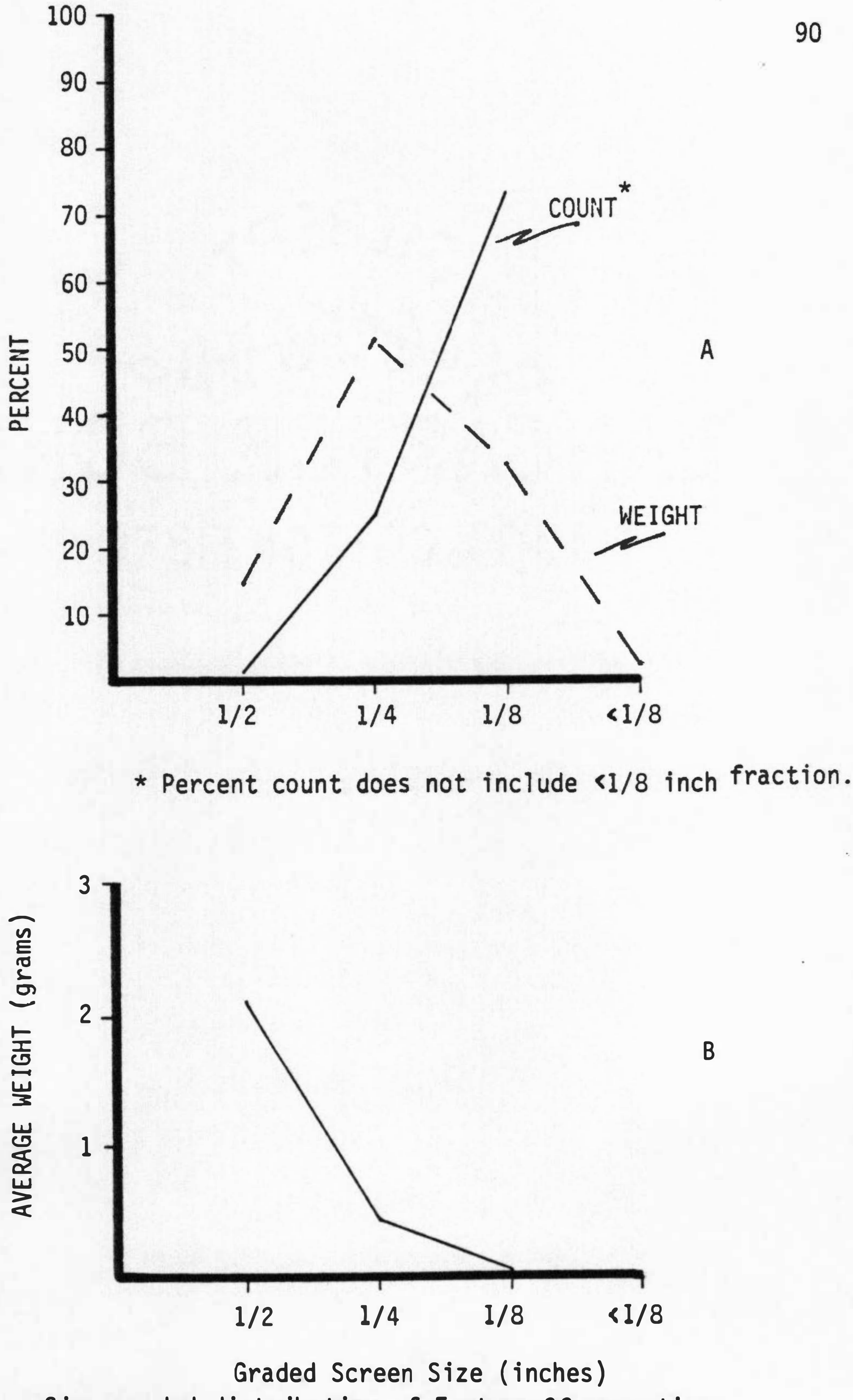



Figure 6.6. Size graded distribution of Feature 22 cremation remains from the Ervin site, 40MU174, Tennessee a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

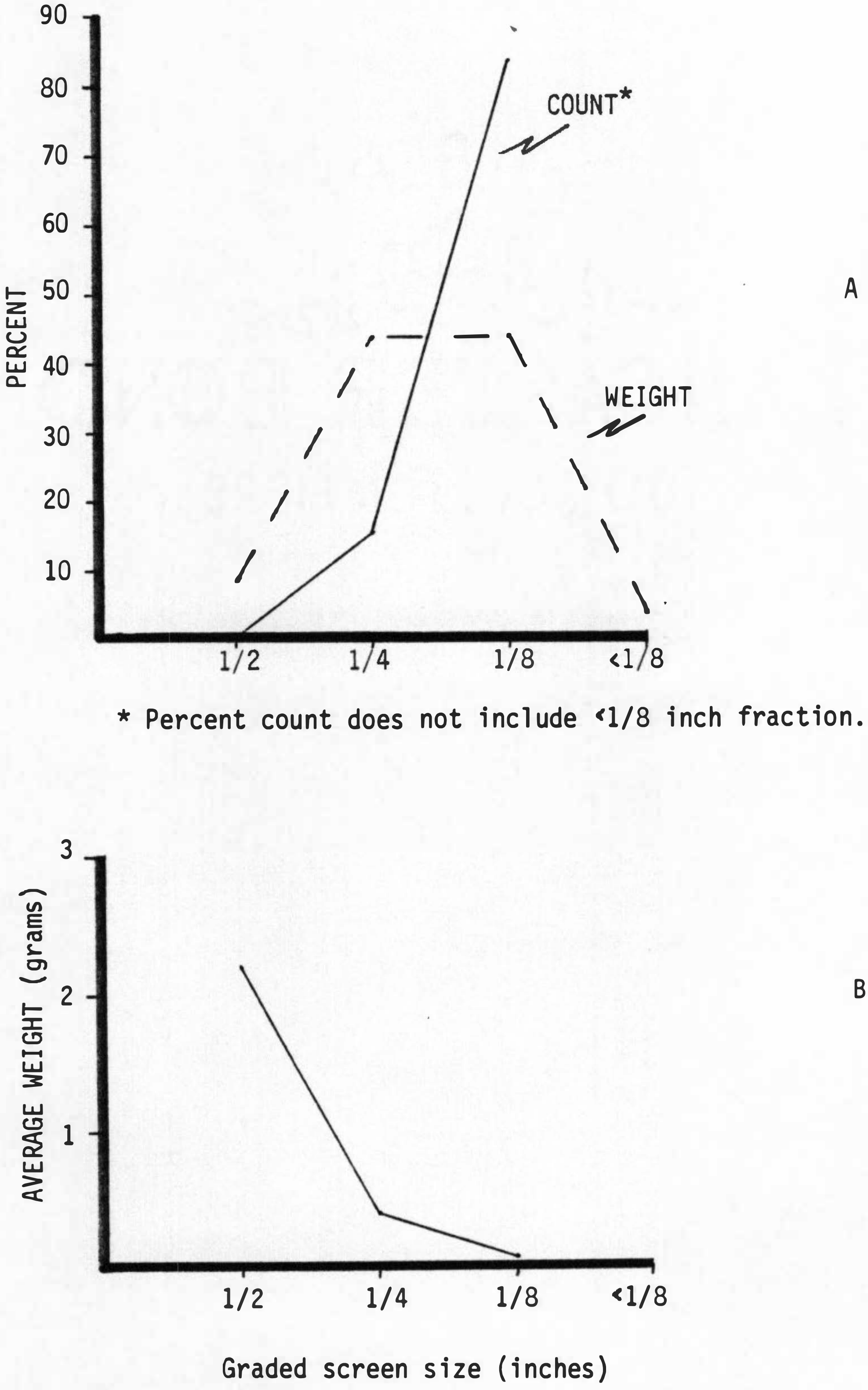



Figure 6.7. Size graded distribution of Feature 35 cremation remains from the Ervin site, 40MU174, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

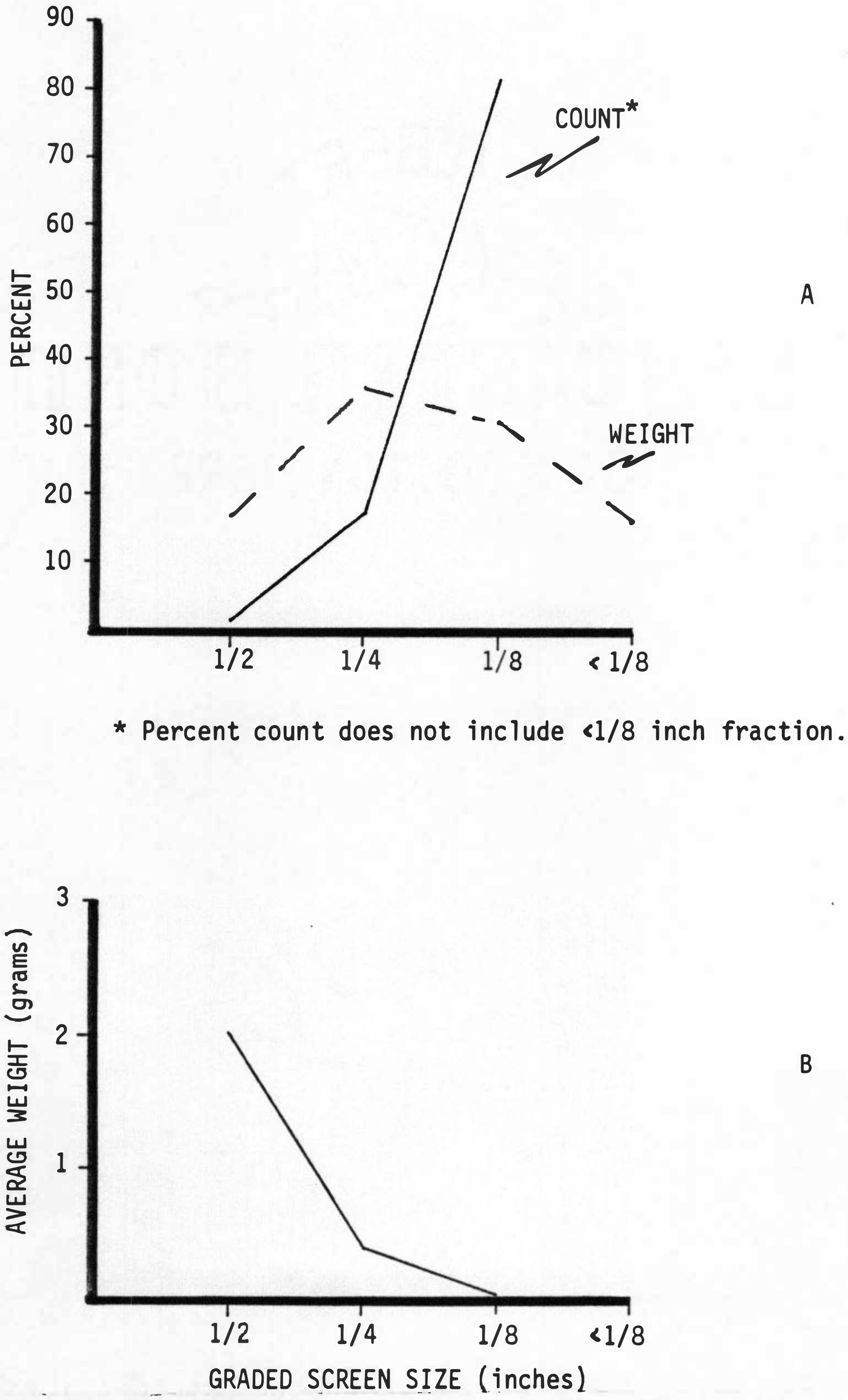
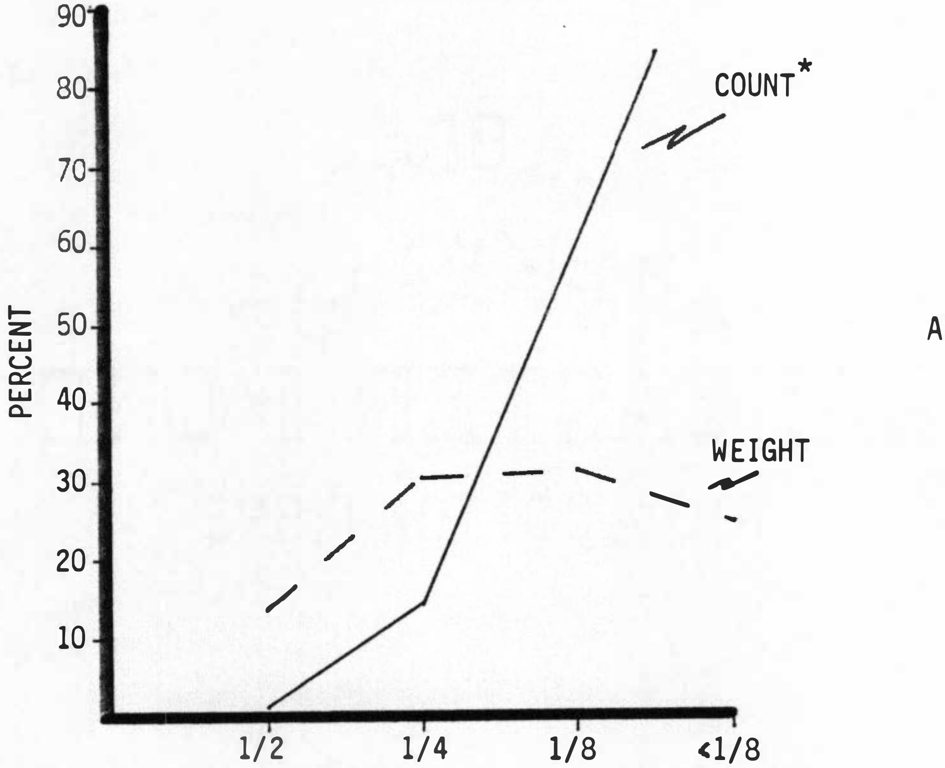



Figure 6.8. Size graded distribution of Feature 36 cremation remains from the Ervin site, 40MU174, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

as the screen size decreases. This mirrors very nicely the situation for the modern cremation. The same pattern is apparent for cremations from the Fattybread, Icehouse Bottom, and 40DV34 sites where one-sixteenth inch waterscreen recovery was used (Figures 6.9-6.14). In all these cases, the contribution by weight is also significantly more for the one-fourth and one-eighth inch grades than for the half inch category. The one-fourth inch and smaller fractions consistently account for at least 60 percent, to more than 80 percent of the total remains by weight. Cremation number 1 from site 40DV34 (Figure 6.12a) is the least characteristic of this series of cremations in that almost 40 percent of its total weight comes from the one-half inch fraction. This cremation has about 30 large pieces of vertebrae which contribute substantially to its one-half inch fraction count and weight. In almost all other cases considered here, the vertebrae have disintegrated and primarily contribute cancellous pieces, occasional processes, and vertebra body margins to the smaller size grades.

When the cremation remains are compared by weight for the one-eighth inch and larger fractions, it is evident that most fall well short of the weight of the modern commercial cremation (Figure 6.15). For the most part this is expected because, even when fine screen recovery is used, there is reason to suspect that not all of the remains from prehistoric cremations would have been gathered and transported to the place of secondary burial. Disturbance processes and recovery techniques also contribute to the problem of under-representation. The commercial cremation yielded nearly 1000 grams




* Percent count does not include <1/8 inch fraction.

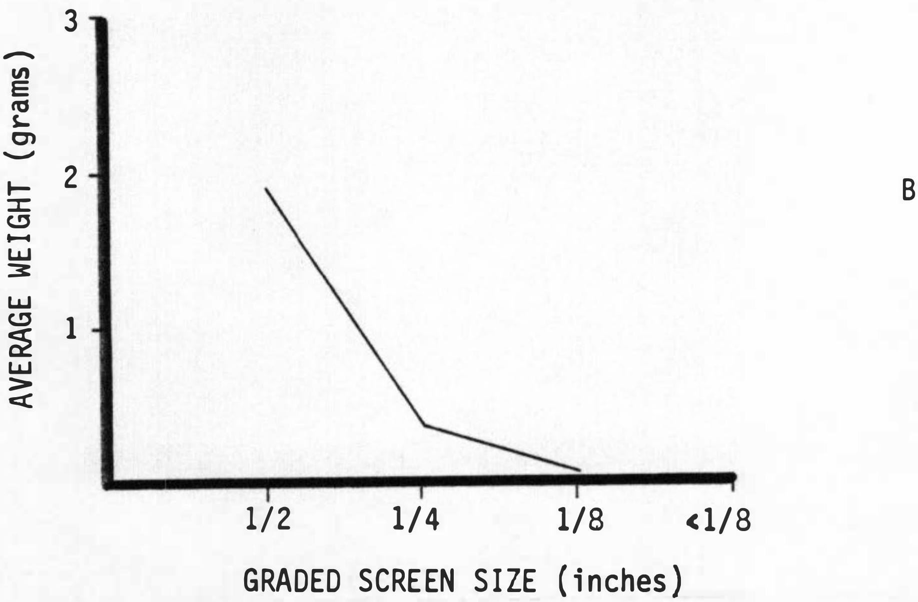



Figure 6.9. Size graded distribution of remains from cremation Feature 1 from Area A3 at the Fattybread Branch site, 40MU408, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

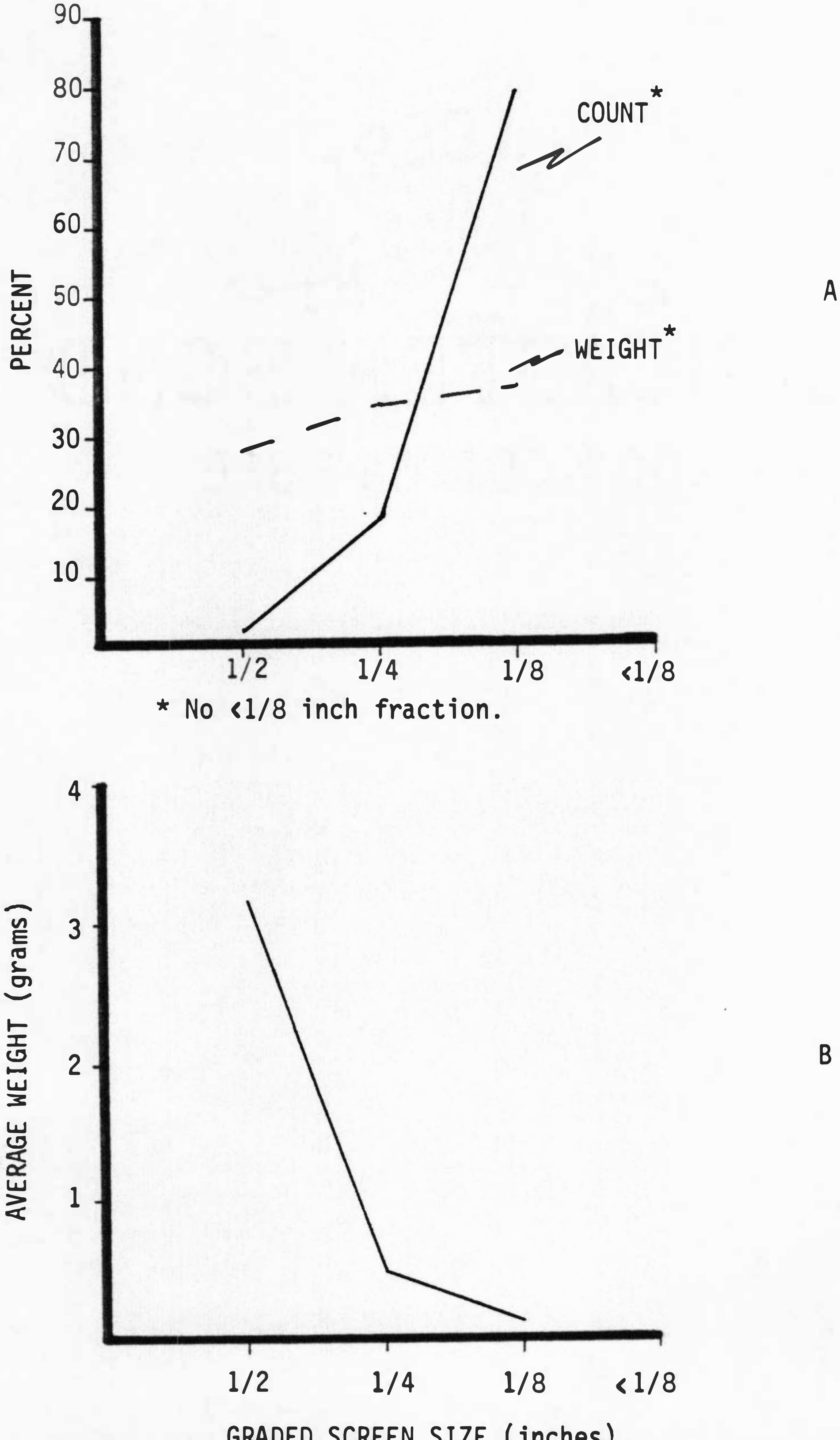



Figure 6.10. Size graded distribution of remains from cremation Feature 1 from Area A1 at the Fattybread Branch site, 40MU408, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

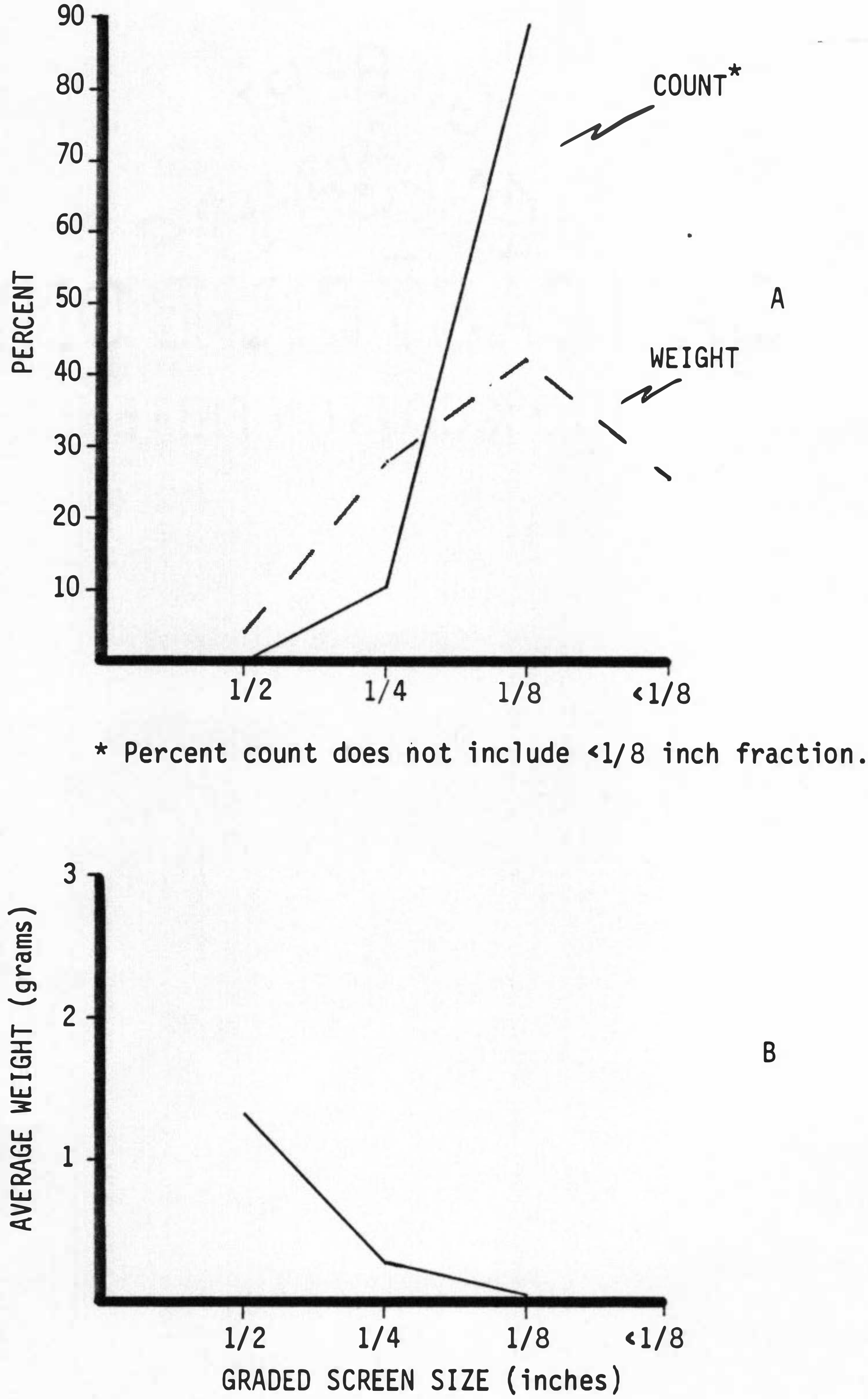
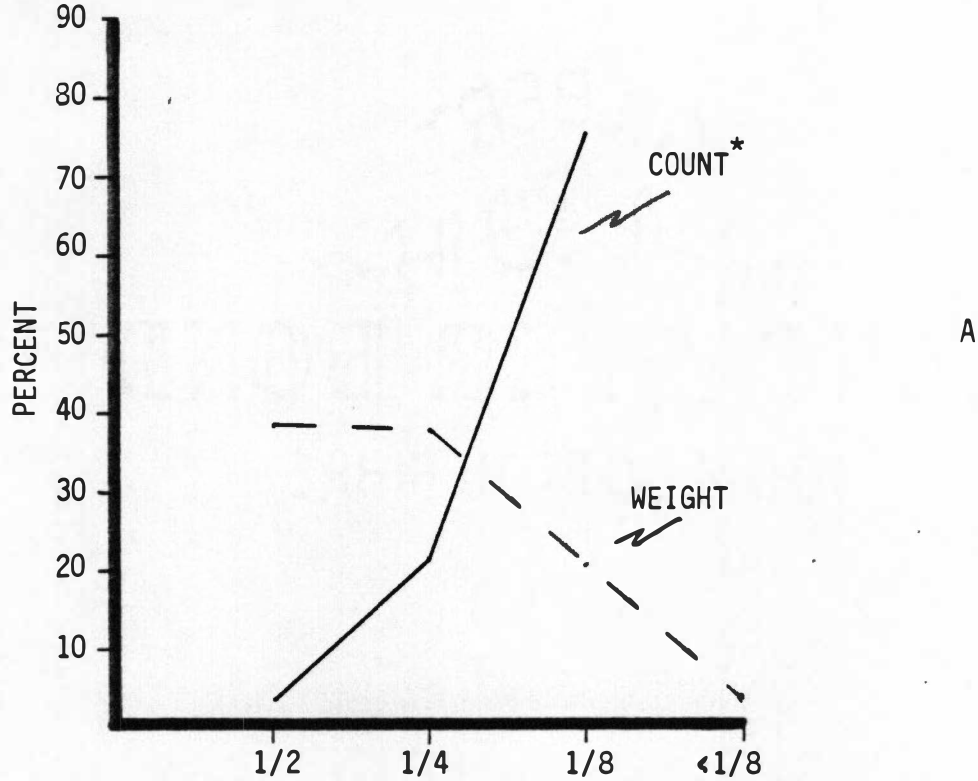



Figure 6.11. Size graded distribution of remains from Feature 583 cremation, Burial 2, Icehouse Bottom site, 40MR23, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.




* Percent count does not include <1/8 inch fraction.

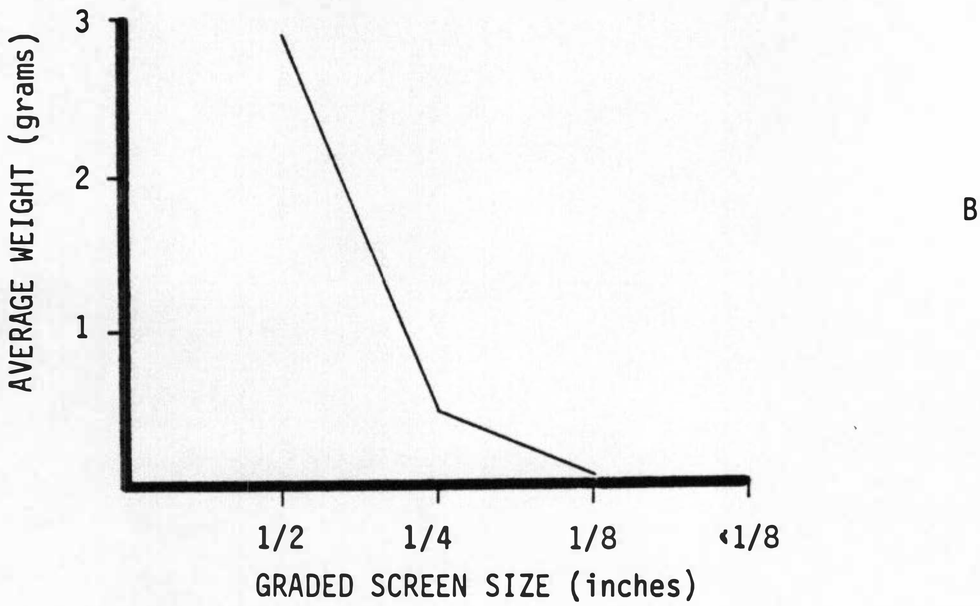
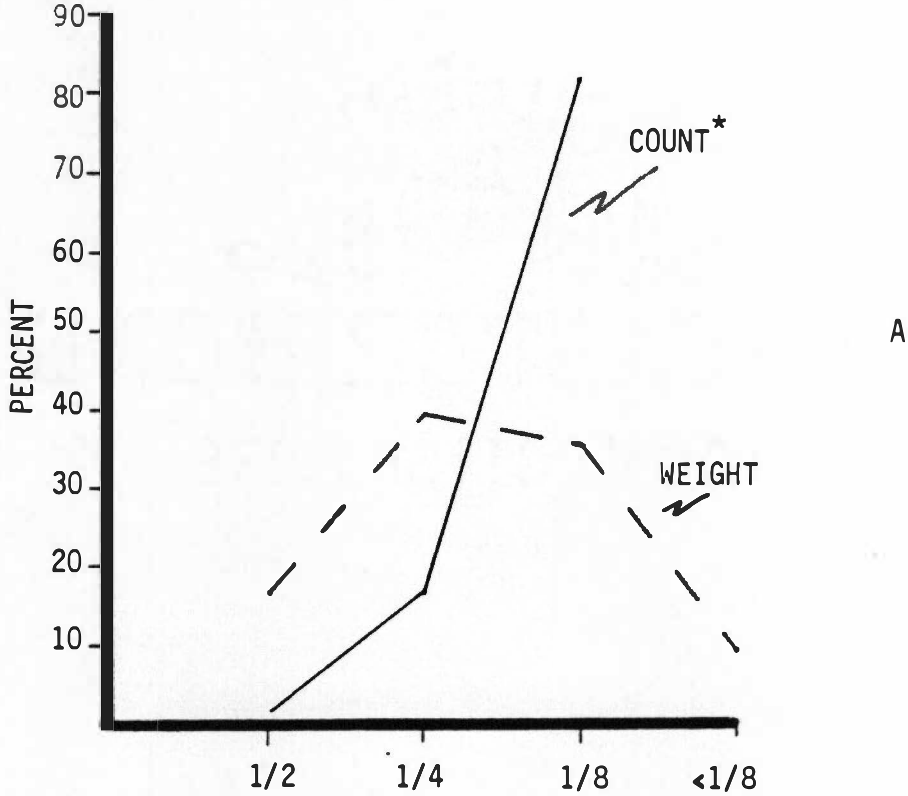



Figure 6.12. Size graded distribution of remains from Cremation 1, 40DV34, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.




* Percent count does not include <1/8 inch fraction.

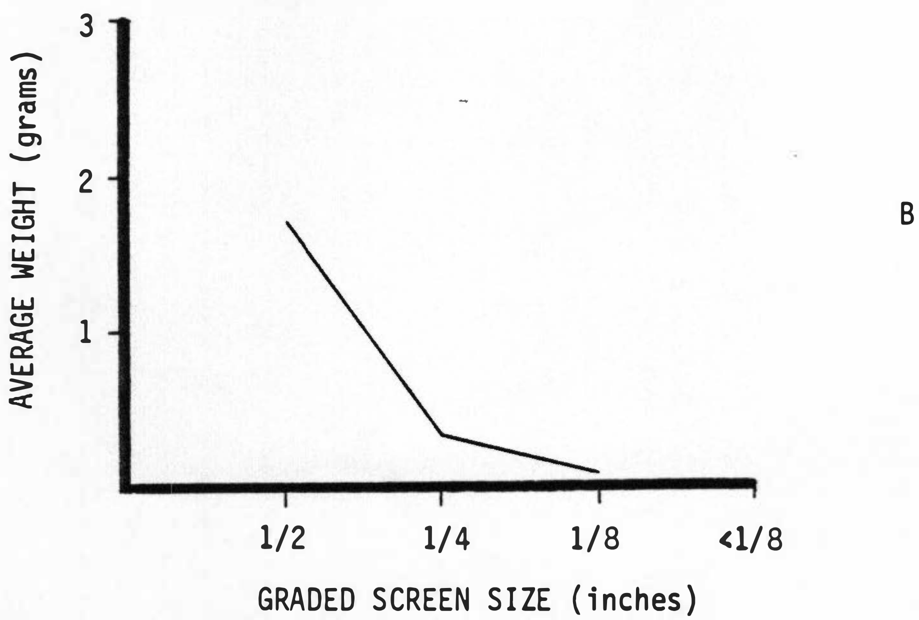



Figure 6.13. Size graded distribution of remains from Cremation 2, 40DV34, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

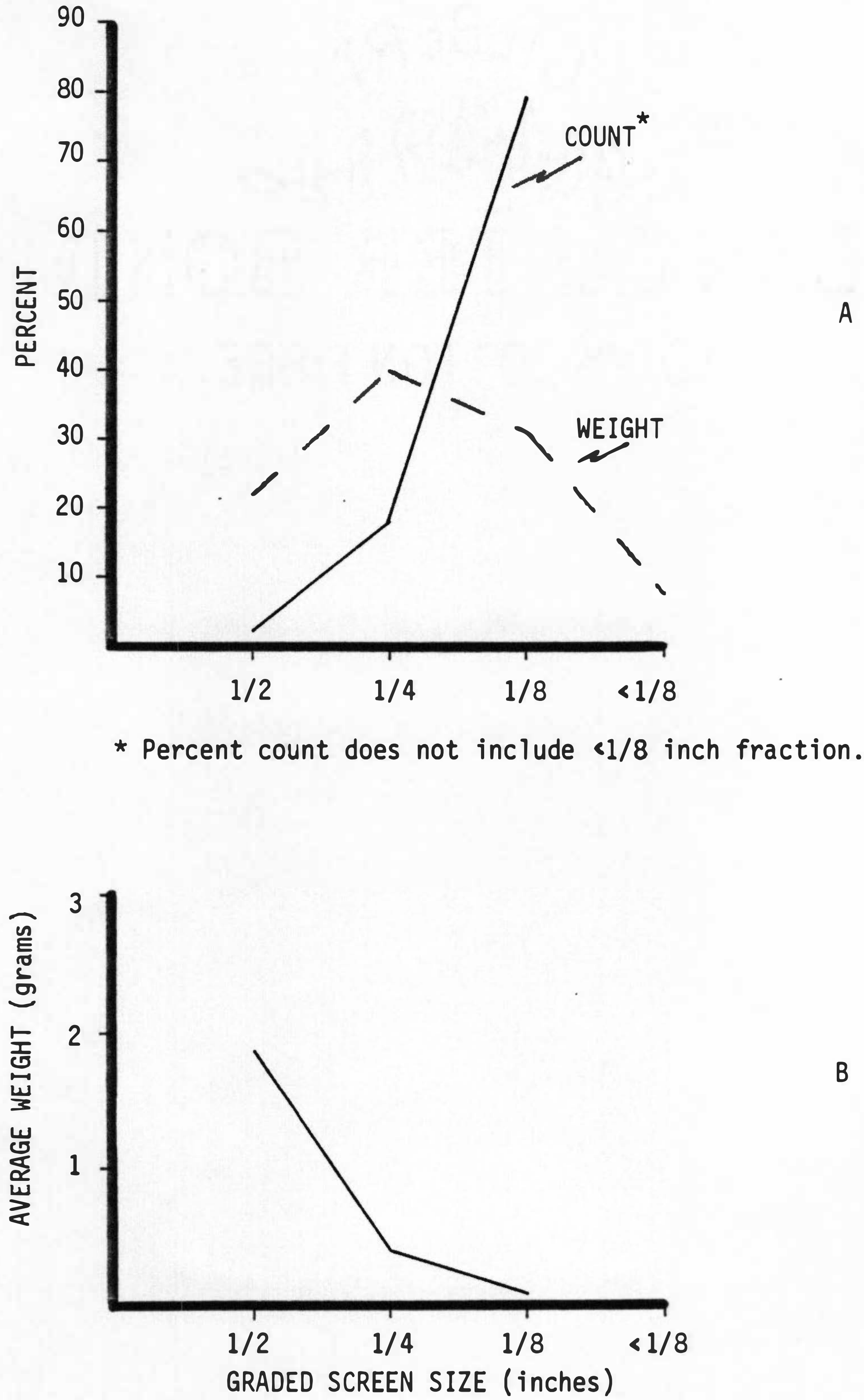



Figure 6.14. Size graded distribution of remains from Cremation 3, 40DV34, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

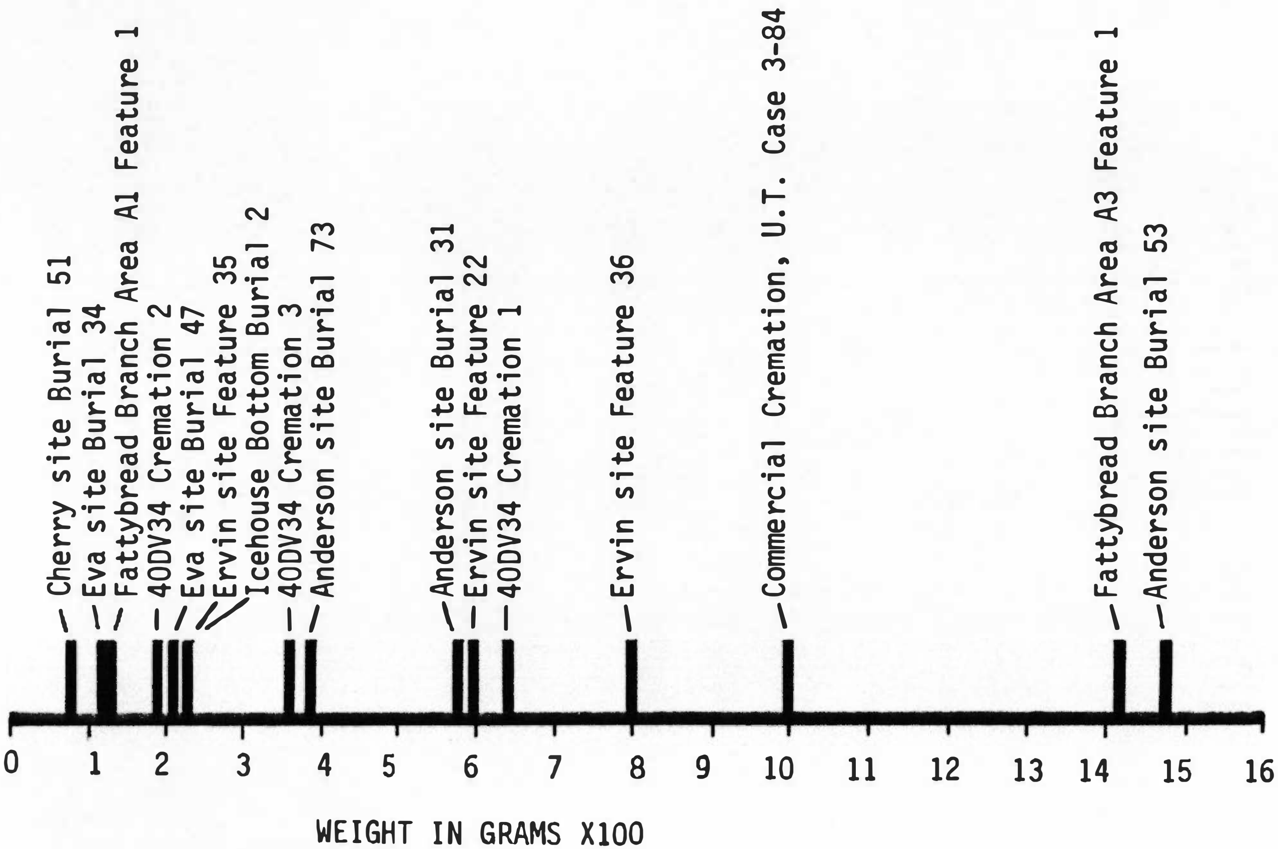



Figure 6.15. Total weights of cremation remains larger than one-eighth inch in size (recovered from one-eighth inch or larger mesh screens) from 15 cremations analyzed in this study.

of calcined bone larger than one-eighth inch in size. The closest prehistoric case is Feature 36 from Ervin which produced about 800 grams. This was the only one of three cremations at Ervin which had not been disturbed by plowing. Another consideration is that cremations with a small quantity of calcined bone may, in some cases, reflect infant or child burials. Data from two Middle Woodland McFarland Phase infant cremations from the Parks site in Coffee County in the upper Duck River Valley, are presented by Brown and Magennis (1982:Table 31). These two infant cremations, Feature 127 (22.8 g) and Feature 133 (31.8 g) produced an average of 27.3 grams of calcined bone from one-sixteenth inch waterscreen recovery.

Two cremations produced considerably more than the "expected" 1000 grams, one from Fattybread and one from Anderson. The Fattybread case is of special relevance in that an osteological analysis demonstrated that two individuals were represented (Amick 1985:404-406). This case gives strength to the argument that cremations with significantly more than 1000 grams of bone (larger than one-eighth inch in size) probably include more than one individual. The other case with more bone than would be expected from a single individual is from the Anderson site, Burial 53. The large amount of bone and the fact that only one-half inch recovery was used strongly suggests that more than one individual is represented in this Anderson site cremation. This correlation between weight and number of individuals is further supported by Binford's (1972:383-389) analysis of a cremation burial from the Riverside Cemetery in Michigan. Burial No. 6 at Riverside produced a

total of 2946.74 grams of burned bone. This is about three times the amount we would expect from a single individual given relatively good recovery techniques. An analysis of the skeletal elements present indicated that at least four individuals were represented in the cremation. This corresponds well with the findings in this study.

The second pattern of size and weight distribution for cremated remains is documented by cases from the Anderson, Cherry, and Eva sites (Figures 6.16--6.21). In these cases the tendency is for a steady decrease in weight <u>and</u> count as screen size decreases. This is as would be expected given recovery techniques (1/2 inch screening or no screening) which do not enhance the collection of small pieces. For some burials in this group (Anderson site Burial 31 and Cherry site Burial 51) the peak frequency for count occurs at the one-fourth inch size (Figures 6.16a and 6.19a). This results from the presence of numerous long, narrow fragments of calcined long bone which are fairly large, easily observed in the field, and will often remain in a one-half inch mesh screen even though they can pass through. For these cremations as a group, the pattern of size and weight distribution by size grade is essentially the inverse of that observed for the modern cremation and for those from fine screen recovery. Also, for this group of coarser recovery cremations, the mean size or weight for each size grade, and for all size grades considered collectively, is larger than for the fine screen recovery cremations (Figure 6.22). This simply reflects the fact that the smaller pieces of each size grade have a much higher likelihood of loss or not being recognized than when fine screening is employed.

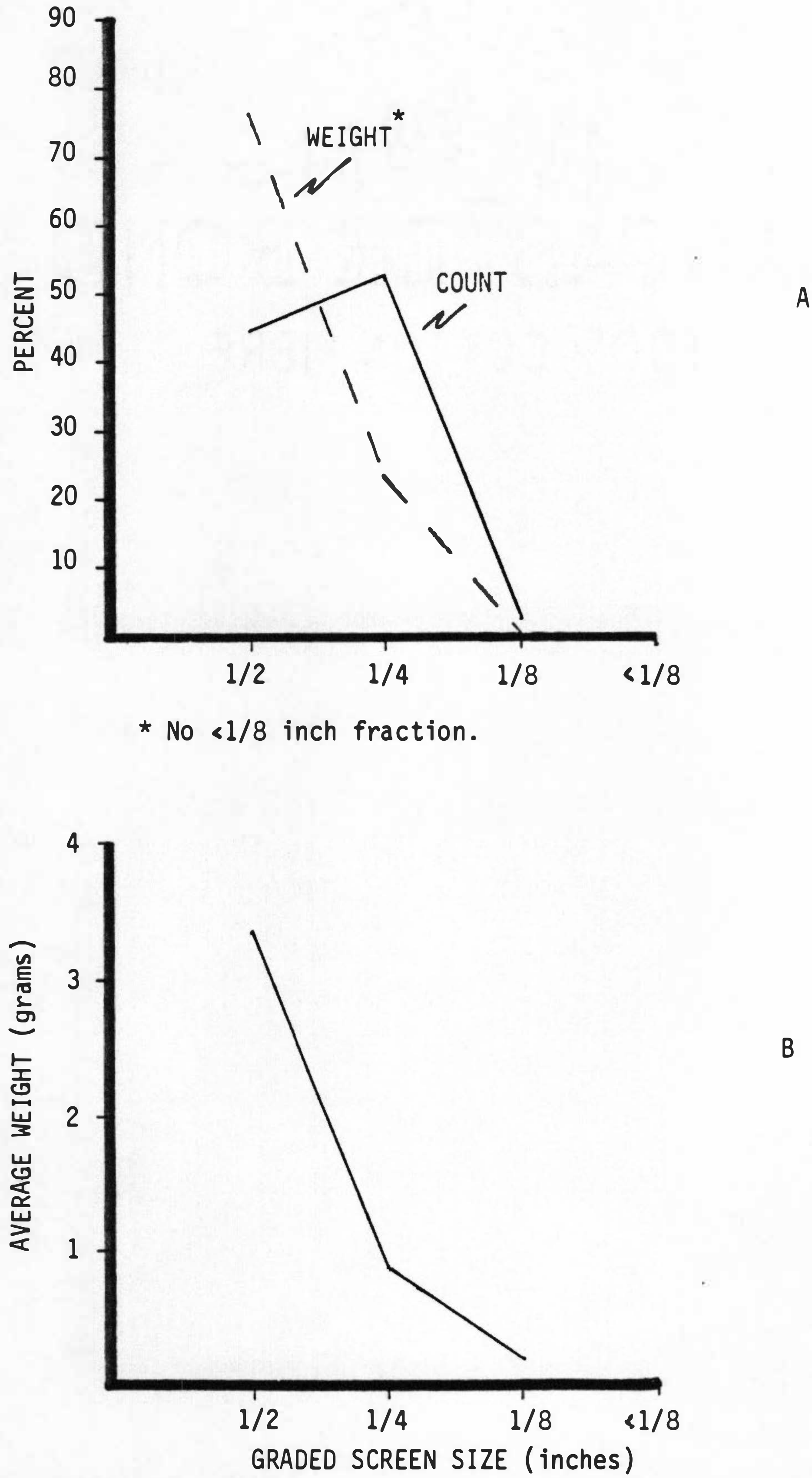
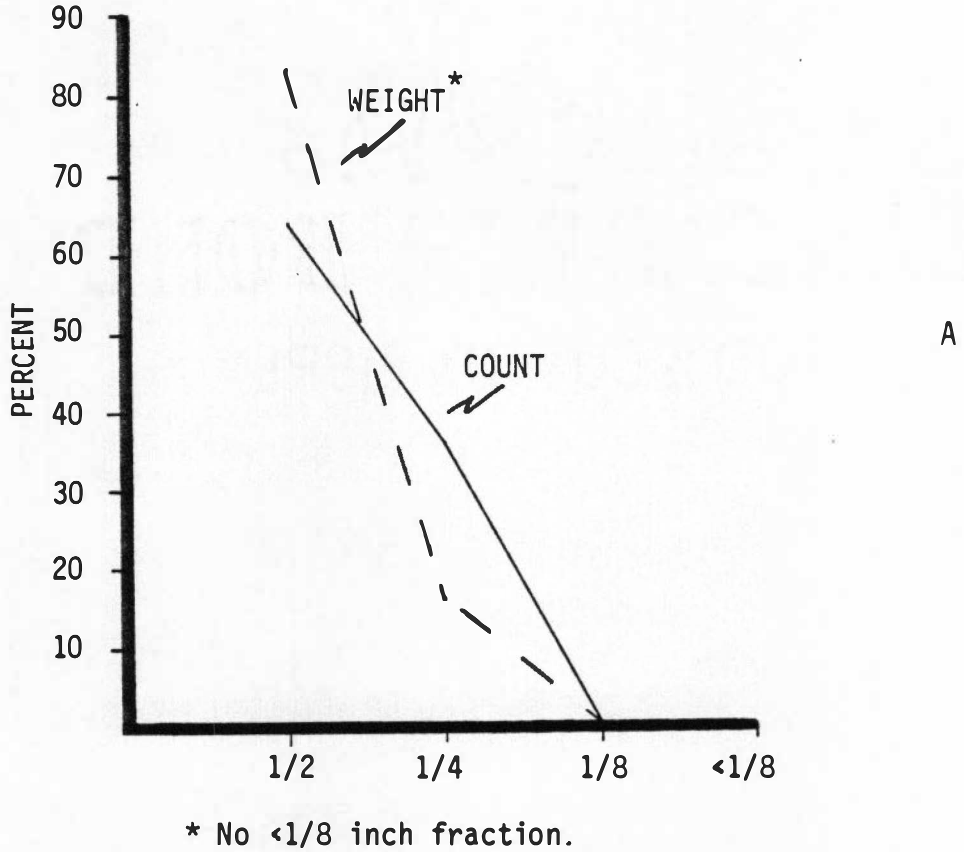



Figure 6.16. Size graded distribution of remains from Burial 31 cremation from the Anderson site, 40WM9, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.



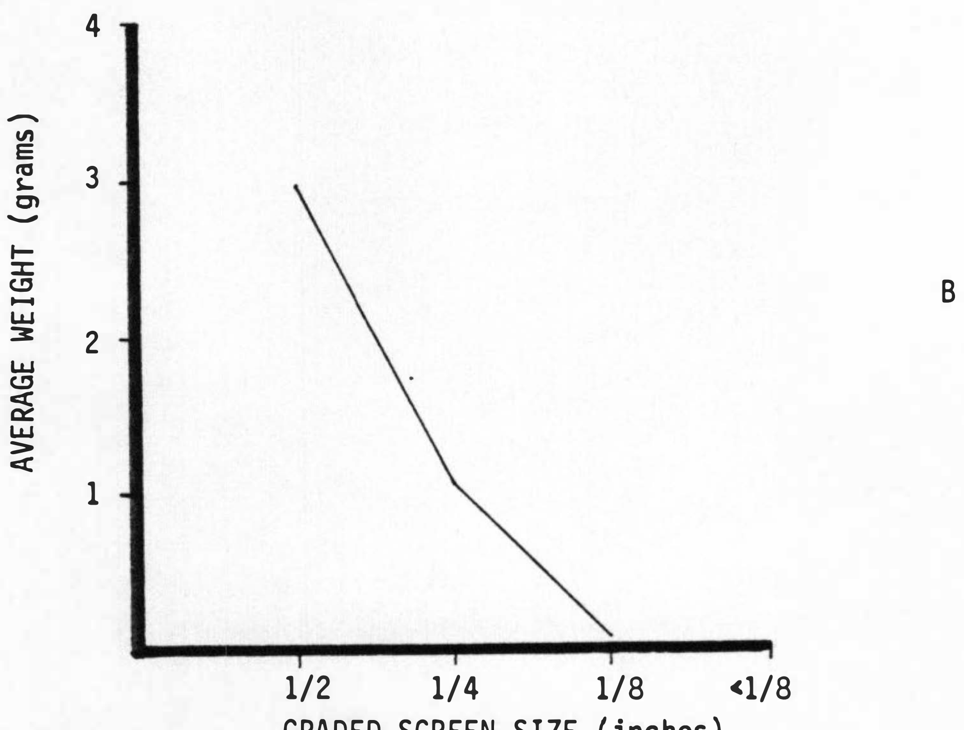




Figure 6.17. Size graded distribution of remains from Burial 53 cremation from the Anderson site, 40WM9, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

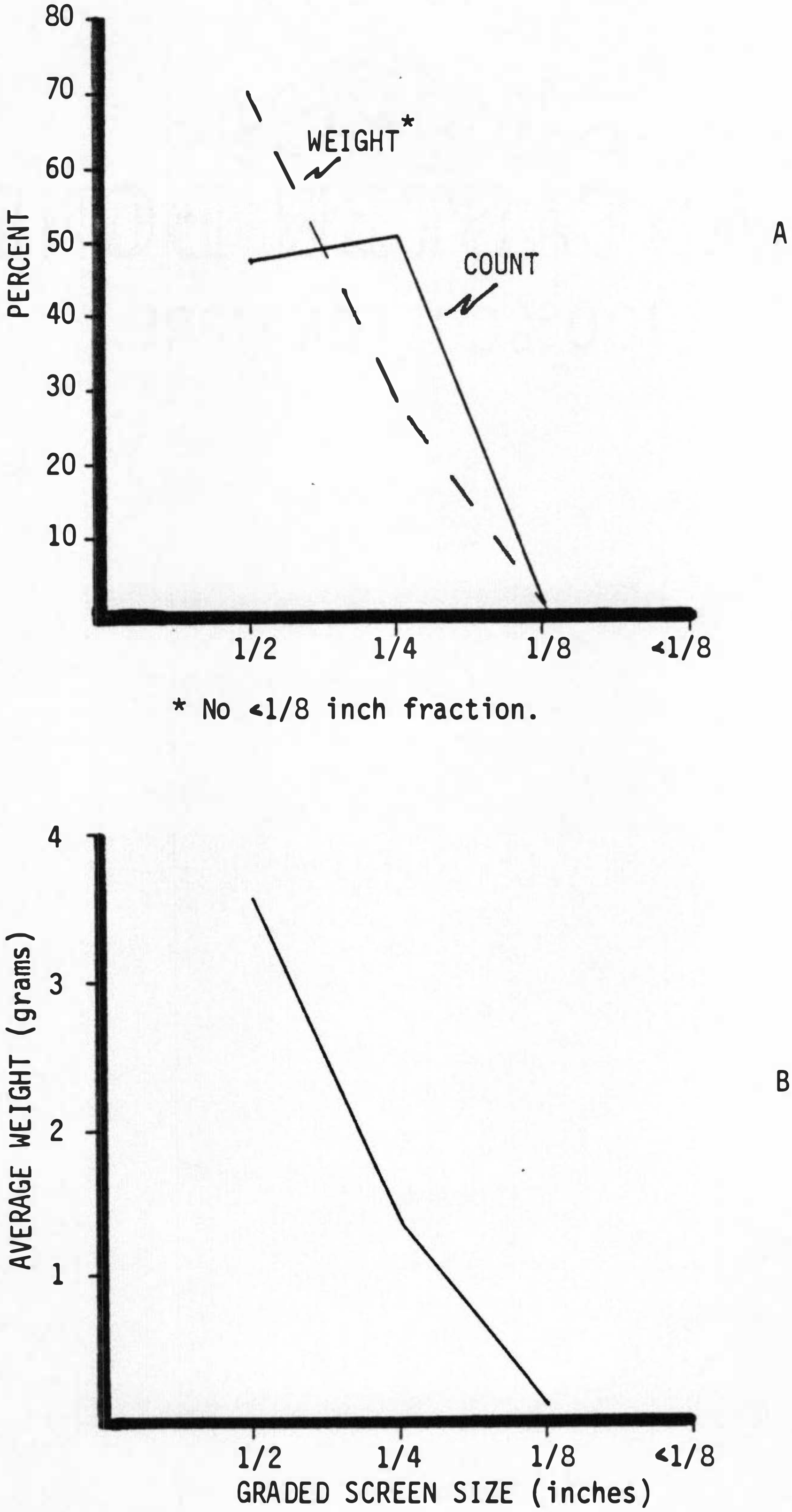
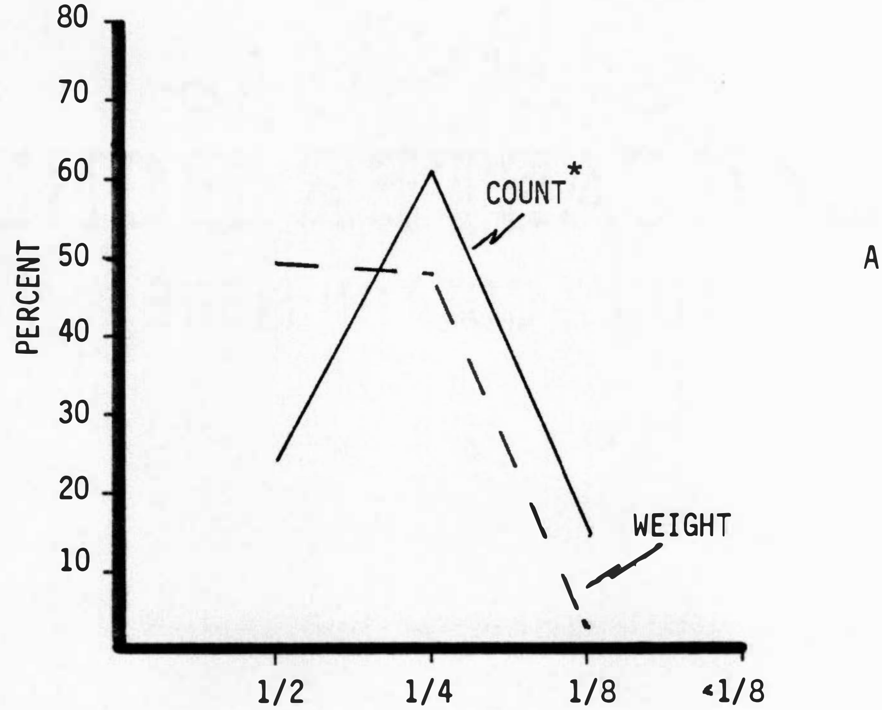



Figure 6.18. Size graded distribution of remains from Burial 73 cremation (Feature 1) from the Anderson site, 40WM9, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.




* No <1/8 inch fraction.

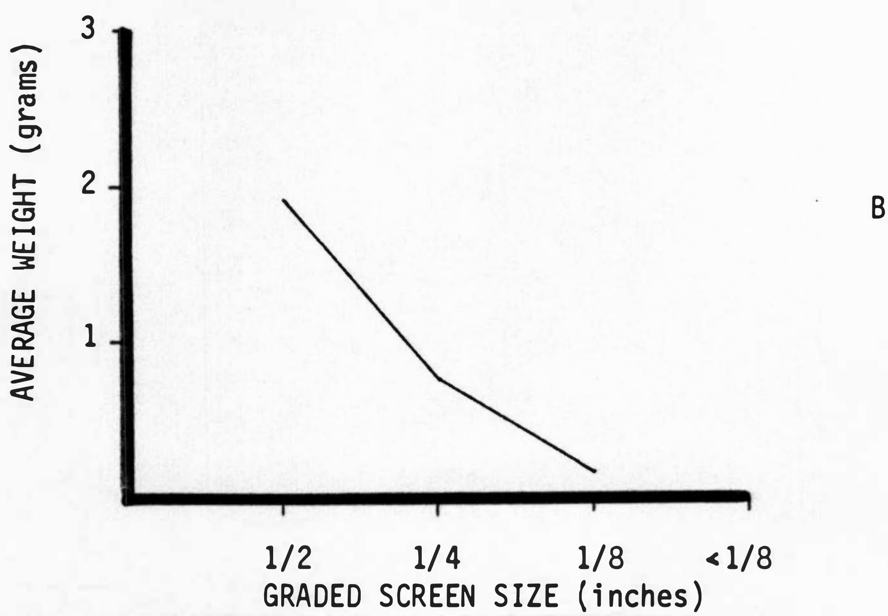



Figure 6.19. Size graded distribution of remains from Burial 51 cremation from the Cherry site, 40BN74, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

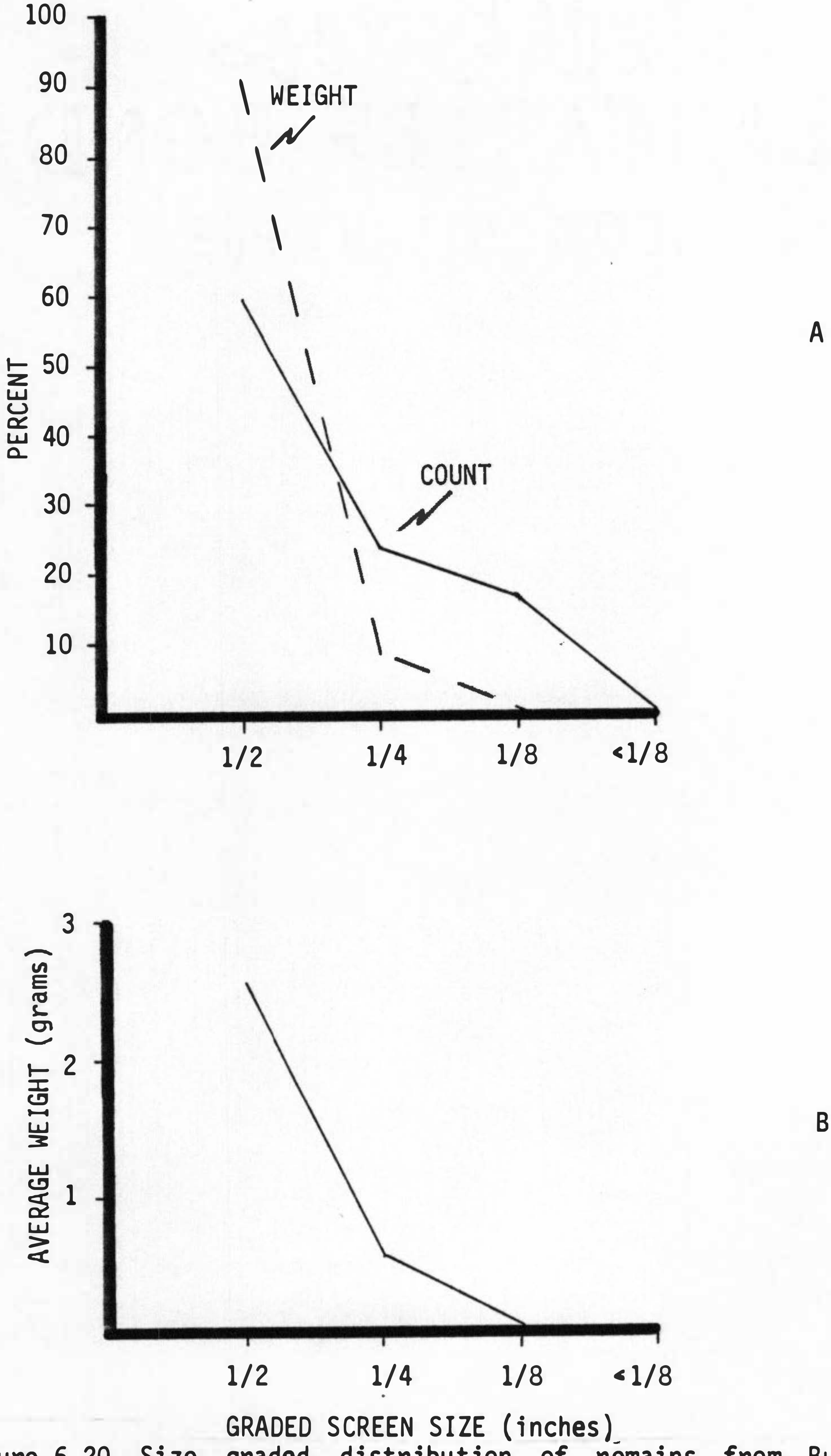



Figure 6.20. Size graded distribution of remains from Burial 47 cremation from the Eva site, 40BN12, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

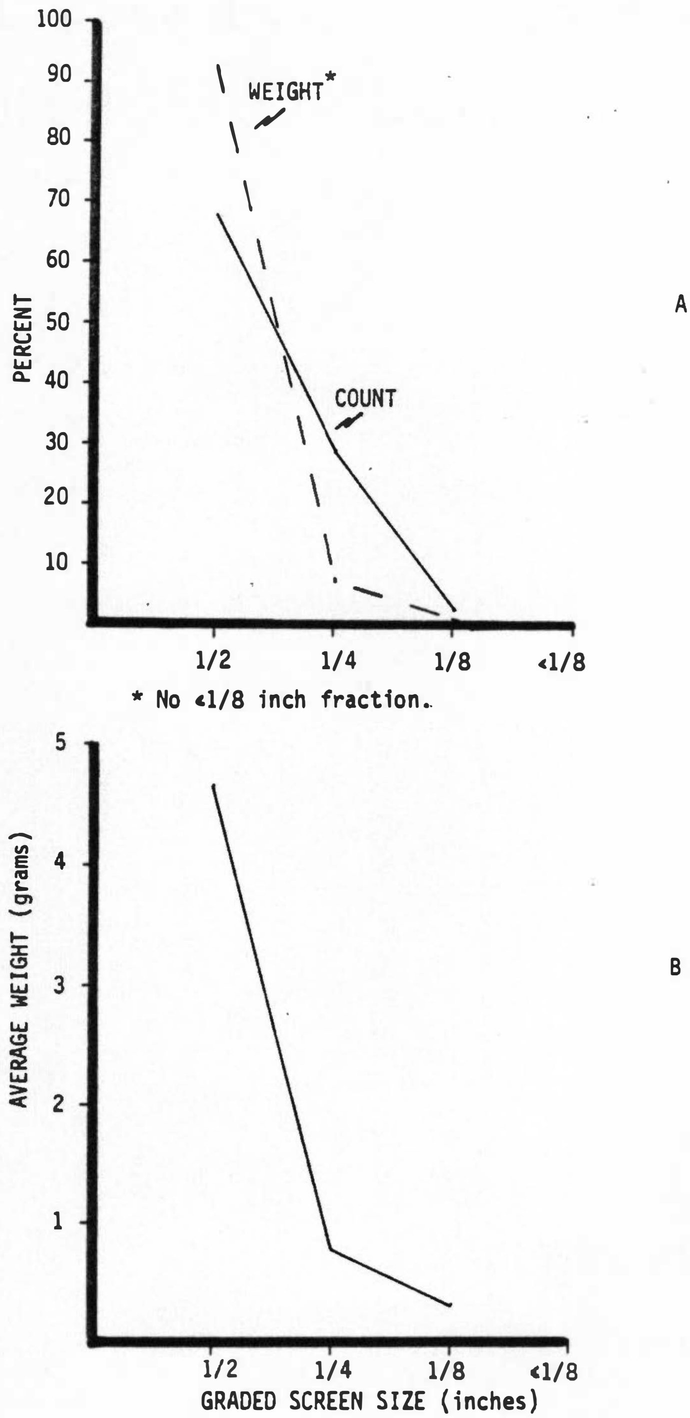



Figure 6.21. Size graded distribution of remains from Burial 34 cremation from the Eva site, 40BN12, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of cremated bone by size grade as indicated by average weight.

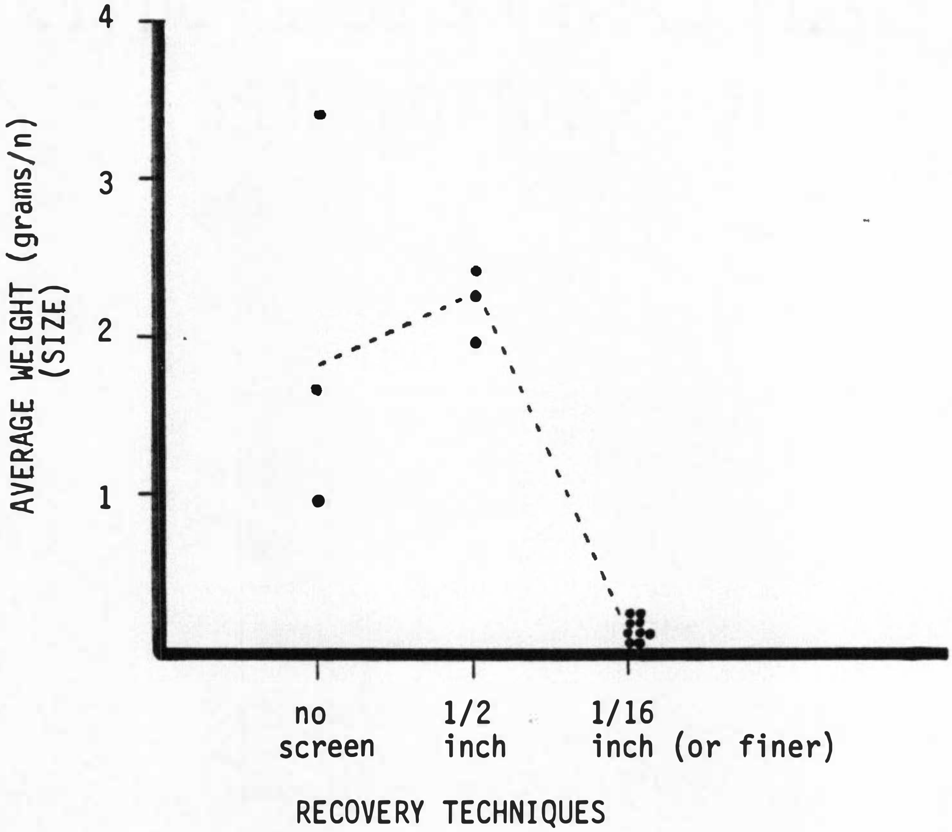



Figure 6.22. Size of recovered cremation burial bone, as indicated by average weight, plotted against recovery techniques as reflected by screen size.

The general results of comparing these cremations which were recovered using different techniques can be summarized as follows. First, the configuration of the weight and count distribution by size grade differs markedly, dependent upon field techniques. This is especially important in that under-representation of the one-fourth and one-eighth inch fractions may considerably impair or reduce the probability of recovering identifiable human elements. Also, significant contribution to the overall weight of bone per cremation is made by the one-fourth and one-eighth inch fraction. An accurate assessment of weight, which can assist in determinations of how many individuals are represented by specific cremations, is of limited reliability unless these smaller size fractions are considered. The importance of screening in recovery and recognition of cremations may also be reflected in the relative frequency of cremation occurrences when comparing sites which were screened to sites which were not. For 16 sites in the Middle South region where secondary cremations are reported, the average proportion of cremation burials is 60.75 percent, when the fill was screened (n=8 sites). For the sites (n=8) which were not screened, the percentage of secondary cremations was only 8.02 percent.

A final factor in cremation recognition which is considered here regards the confounding and camouflaging effect which animal bones can have on cremation deposits. In the desert Southwest, cremation of animals, especially mountain sheep, was practiced as part of certain hunting ceremonies (e.g., Hayden 1985). For the most part, however, cremation as reflected in ethnohistoric accounts for

eastern North America, was restricted to humans. Therefore, when concentrated deposits of calcined bone are encountered archaeologically, the possibility that a human cremation is represented should be investigated. It is not uncommon, however, for cremations to contain quantities of non-human bone.

Unburned, and sometimes burned, animal bone is documented in direct association with human cremation remains in a number of cases from the Great Lakes region, the Northeast and the Middle South (Binford 1963b; Bourque 1976; J. Chapman 1981:126; Dincauze 1968; Hofman 1985a, 1985b; Joerschke 1983:29; Robbins 1968; Tomak 1979, 1983). Such remains are typically considered to represent food offerings which were interred with the cremated remains at the time of cremation, and/or at the time of final burial. The problem potentially created by such associations is that the unburned non-human bones are commonly larger, more complete, and more easily identified than the cremated human remains. In some instances this may well have resulted in the recognition of a "refuse pit" which contains animal bone and miscellaneous, typically unidentifiable, calcined bone fragments. There is little safe-guard against this problem other than an awareness of the possibility. To further illustrate the nature of the situation, animal bone found in association with the three Ervin cremations is tabulated here (Tables 6.3-6.6), and has been processed in the same manner as the cremated human remains (Figures 6.23). Distinguishing between small fragments of calcined human bone and calcined animal bone would be unrealistic, but this was not a problem with the Ervin samples. All identified

Table 6.3. Species and element listing for animal bone from Feature 22 cremation, Ervin site.

| Species | Common Name | Elements |
|---|---|---|
| *Odocoileus virginianus* | white-tailed deer | maxillary premolars (2), mental foramen*, incisor, molar fragments (3), mandibular molar, lunar, proximal radius, tooth fragment, mandibular premolar, lumbar vertebra, proximal metatarsal |
| *Procyon lotor* | raccoon | mandible, maxillary canine, m3 and ascending ramus* |
| *Castor canadensis* | beaver | mandibular premolar |
| *Sylvilagus floridanus* | cottontail | molar |
| *Sylvilagus* sp. | rabbit | molar*, pelvis fragment*, molar fragments (3), proximal scapula |
| *Marmota monax* | woodchuck | palatine portion, molars (4), incisors (2) |
| *Lutra canadense* | river otter | maxillary canine |
| *Mustela vison* | mink | calcaneum, distal humerus, acetabulum |
| *Sciurus* sp. | squirrel | calcaneum, proximal femur, metatarsal, incisor, incisor fragment |
| *Didelphis marsupialis* | opossum | distal tibia |
| *Mephitis mephitis* | striped skunk | m2 and m3 with ascending ramus |
| *Peromyscus* sp. | mouse | lower incisor, proximal femur |

Table 6.3. (continued)

| Species | Common Name | Elements |
|---|---|---|
| *Scalopus aquaticus* | eastern mole | ulna* |
| *Meleagris gallopavo* | turkey | phalanx*, phalanx, cuniforme, proximal tarsometatarsus (4), midshaft tarsometarsus |
| *Chelydra serpentina* | snapping turtle | carapace pieces (4) |
| *Sternothaerus odoratus* | musk turtle | plastron fragment |
| *Rana* sp. | frog | illium, acetabulum |
| *Pylodictus*/*Ictalurus* sp. | catfish | dorsal spine |

* Indicates that element has been burned. Analysis conducted by Mary Ellen Fogarty.

Table 6.4. Species and element listing for animal bone from Feature 35 cremation, Ervin site.

| Species | Common Name | Elements |
|---|---|---|
| Mephitis mephitis | striped skunk | distal fibula |
| Sylvilagus sp. | rabbit | proximal scapula |
| Sciurus niger | fox squirrel | proximal ulna* |
| Sciurus carolinensis | gray squirrel | distal humerus |
| Trionyx sp. | soft-shelled turtle | carapace pieces (2) |
| Chelydra serpentina | snapping turtle | carapace pieces (2) |

* Indicates element has been burned. Analysis conducted by Mary Ellen Fogarty.

Table 6.5. Species and element listing for animal bone from Feature 36 cremation, Ervin site.

| Species | Common Name | Elements |
| --- | --- | --- |
| Odocoileus virginianus | white-tailed deer | proximal metatarsal, proximal tibia |
| Castor canadensis | beaver | phalange |
| Sylvilagus floridanus | cottontail | incisor*, distal humerus, proximal scapula*, distal humerus*, calcaneum, molar fragments (6) |
| Sylvilagus sp. | rabbit | metatarsal |
| Marmota monax | woodchuck | incisors (2), carpal, molars (6), molar* |
| Mustela frenata | long-tailed weasel | proximal scapula |
| Mustela vison | mink | proximal scapula |
| Mephitis mephitis | striped skunk | upper right carnasial, upper m3 |
| Sciurus carolinensis | gray squirrel | molars (6), molar*, carpal |
| Sciurus niger | fox squirrel | proximal ulna, distal humerus, proximal femur* |
| Sciurus sp. | squirrel | incisors (2) |
| Microtus sp. | vole | molars (4) |
| Peromyscus sp. | mouse | proximal tibia, distal femus (2), distal ulna |
| Lepisosteus sp. | gar | scales* (16), scale (1), vertebra, vertebrae* (3) |
| Ictalurus punctatus | channel catfish | articular |

Table 6.5. (continued)

| Species | Common Name | Elements |
|---|---|---|
| *Chelydra serpentina* | snapping turtle | carapace pieces (8) |
| *Trionyx* sp. | soft-shelled turtle | carapace pieces (10) |

* Indicates element is burned. Analyses conducted by Mary Ellen Fogarty.

Table 6.6. Summary of animal bone data by class and degree of burning from Ervin site, 40MU174, cremation features.*

| CLASS | UNBURNED | | BURNED | | PARTIALLY BURNED | |
|---|---|---|---|---|---|---|
| | count | weight (grams) | count | weight | count | weight |
| -FEATURE 22- | | | | | | |
| Mammal | 460 | 158.8 | 394 | 27.8 | 16 | .7 |
| Aves | 49 | 42.4 | 29 | 4.4 | 2 | 2.9 |
| Ichthyes | 26 | 15.1 | 6 | .1 | - | - |
| Turtle | 9 | 1.9 | 7 | 1.0 | - | - |
| Snake | 5 | .5 | 5 | .6 | - | - |
| Amphibian | 1 | .1 | - | - | - | - |
| non-classified | 6 | .3 | 3 | .6 | | |
| -FEATURE 35- | | | | | | |
| Mammal | 17 | 1.8 | 13 | 1.0 | - | - |
| Aves | 28 | 1.6 | 8 | .6 | - | - |
| Ichthyes | 2 | .1 | - | - | - | - |
| Turtle | 4 | .7 | 2 | .3 | - | - |
| -FEATURE 36- | | | | | | |
| Mammal | 1512 | 89.1 | 1062 | 69.7 | 27 | 3.6 |
| Aves | 28 | 1.6 | 8 | .6 | - | - |
| Ichthyes | 214 | 4.4 | 101 | 1.5 | - | - |
| Turtle | 73 | 14.6 | 10 | .8 | - | - |
| Snake | 47 | 1.5 | 13 | .4 | - | - |
| non-classified | 100+ | 26.4 | 100+ | 21.1 | - | - |

* Counts and weights include bone which is identifiable and unidentifiable at the genus and species levels. All weights are in grams.

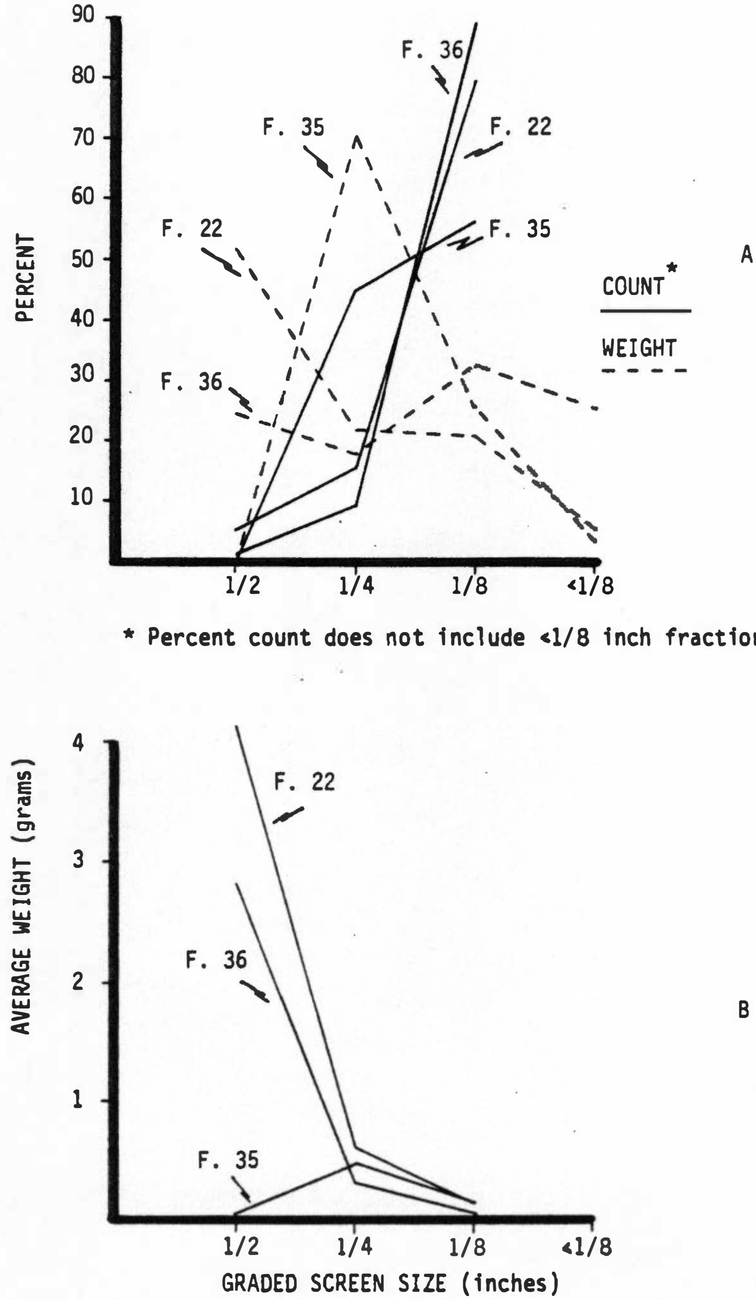



Figure 6.23. Size graded distribution of non-human bone recovered from three cremations (Features 22, 35, and 36) at the Ervin site, 40MU174, Tennessee. a: Percent contribution by count and weight for decreasing size grades. b: Size of bone by size grade as indicated by average weight.

calcined bone of "large mammal" size was human, whereas all identifiably non-human large mammal bone was not calcined. Some of the large non-human bone was partially burned, but was easily distinguishable from the calcined human material. The information presented on the animal bone from the Ervin cremations should enhance awareness of the problems such material can create in working with and identifying human cremations in the archaeological record.

## Patterning in the Archaeological Record: Some Predictions

Archaeological expectations for burial patterning among hunter-gatherers in eastern North America can be capsulized as follows. The earliest free-ranging foragers would have keyed on specific animal resources of large body size and with a high energy return rate. Unhampered by territorial circumscription or place-oriented organization, the likelihood and feasibility of developing fixed burial sites would have been slight. Burials may have occurred widely scattered across the landscape, reflecting the long term land use pattern with limited possibilities for secondary reburial at fixed aggregation sites. As population increased and mobility options decreased, groups would have become increasingly organized around specific places of reliable resource fixity within increasingly limited territories. I am assuming general population increase on a regional scale (Cohen 1977:188-195, 1985), without implying that all localities underwent such steady predictable growth, which some obviously did not (Hofman 1984b:152-153).

Sites for aggregation and preferred burial developed and the frequency of secondary burials at such sites peaked during a period when seasonal collectors occupied relatively large but circumscribed territories (Figure 6.24). These economies focused seasonally upon key resources of high spatial and temporal predictability, and on a variety of more risky but high return species as well. As populations continued to increase, seasonal collectors became increasingly logistically organized within territories of decreasing size. Seasonal residential mobility decreased and there was a concomitant decrease in the need for secondary burial due to factors of mobility and timing. Secondary burial became increasingly important for logistically active individuals and less important for the groups as a whole. In general, if the frequency of secondary burial among hunter-gatherers was significantly related to aspects of group mobility and organization, then primary burial should have increased and secondary burial should have decreased as the territory size of circumscribed groups decreased and as the length and predictability of aggregations increased.

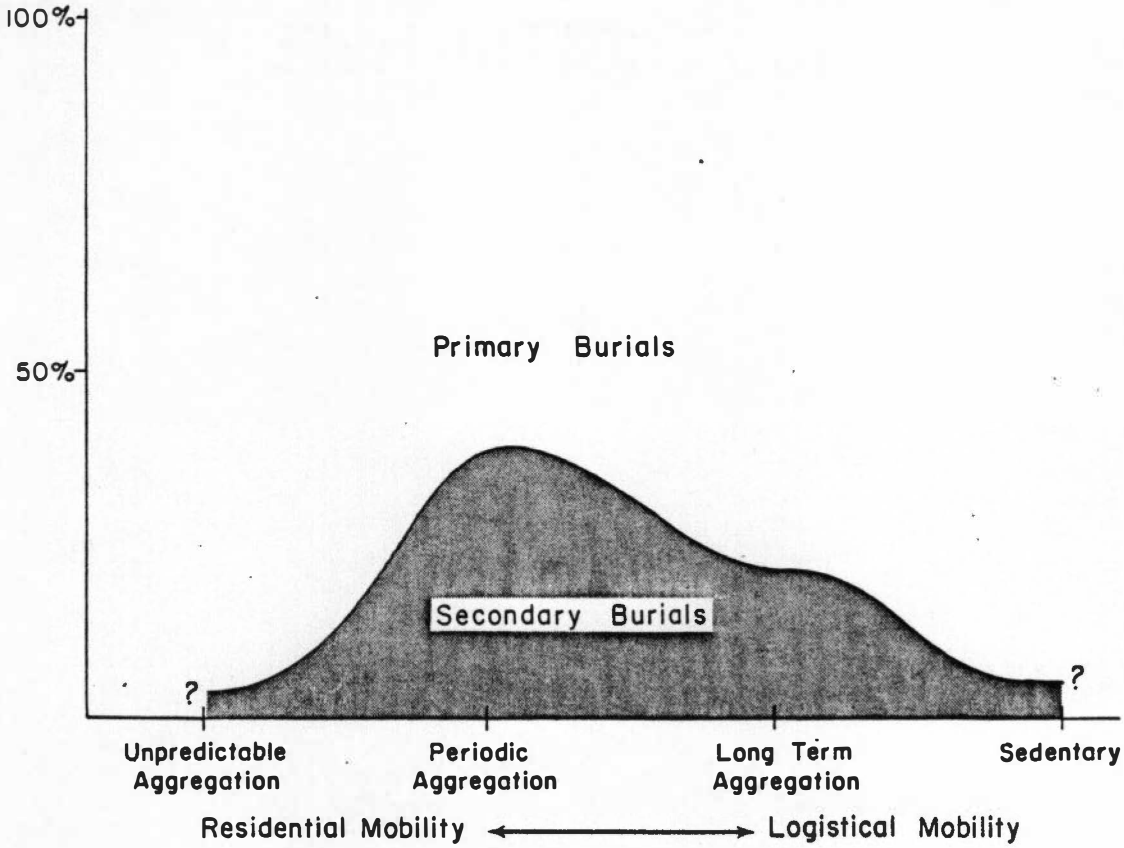



Figure 6.24. Schematic representation of potential relationships between the proportion of secondary burial and differences in organizational strategies and mobility.

# VII. ARCHAIC MORTUARY VARIABILITY: THE MIDDLE SOUTH

> The form and location of burials and other commemoratives over the landscape thus can reveal a great deal about a society, but not necessarily much about the individuals represented. (Braun 1984:193)

The evidence for Archaic mortuary activities in the Middle South comes from a diversity of sites, primarily investigated over the past half-century. Some of the larger Archaic burial samples in the New World come from this area (e.g., Webb 1974). There is, as might be expected, considerable diversity in the preservation, recovery, dating, and reporting of these samples. Some intersite comparisons are necessarily limited by these aspects of sample differences. Most troublesome are the limitations placed on the study of diachronic variation. Key factors which inhibit maximum utilization of the region's Archaic burial record for evaluating diachronic and other aspects of hunter-gatherer mortuary diversity and change are enumerated here. Unfortunately, these factors also impact prehistoric hunter-gatherer burial information from most other areas.

1. Differences of recovery and preservation contribute substantially to sample variation and patterning, independently of factors which operated in the past cultural systems.
2. Small burial samples, due in various cases to small sites, limited excavation, and/or to differential preservation, are very common from many Archaic sites

(Buikstra 1981:123). This commonly results in burial sets which are of limited utility for statistical purposes, unless considered in combination with samples from other sites.

3. Combination of samples from different sites to enhance the reliability of statistical tests, or statistical comparison of samples between sites, requires assumptions pertaining to sample ages and intersite social relationships which may not always be well founded.

4. Different rates of cultural change, especially as concerns degree of sedentism (Brown and Vierra 1983), duration of aggregations, and size of economic territories, make it necessary to consider more than just temporal variation when comparing burial programs. The occurrence and tempo of economic and organizational changes may be considerably different for groups occupying distinctive ecological settings, such as those in major river valleys (e.g., Tennessee River) versus those elsewhere (e.g., Duck River).

Despite such problems, it is possible to here provide initial evaluation of some implications of the model of hunter-gatherer mortuary variability proposed above (Section V). A primary focus of this chapter is with some specific correlates of secondary burial which may correspond to different kinds of group mobility and to factors of aggregation. Residential versus logistical mobility are

expected to result in different patterns of age and sex composition for secondary burials. Grave offerings, such as unburned artifacts in secondary cremation burials, may reflect staging in the burial program and changes in group composition. The overall mortality distributions from a number of sites are also discussed as to expectations for burial patterning at potential aggregation sites versus family or subsistence group camps.

Also, an evaluation of models equating levels of energy expenditure with status differentiation is made using Archaic hunter-gatherer data. It has been repeatedly argued, most eloquently by Tainter (1977, 1978, 1980), that the levels of mortuary energy expenditure exhibited in the archaeological record will correlate closely with levels of status or differentiation within a society. In Section IV above, it was illustrated that such was not the case for a number of hunter-gatherer or otherwise mobile groups. Many such groups use secondary burial, often requiring more effort than primary burial, due to reasons of mobility and the time and place of death. In such cases we would not expect a direct, or even particularly close, correlation between secondary burial and social status differentiation. One concern of the following discussion, then, is to compare occurrences of secondary burial with the overall occurrence of burial associations which might be considered indicators of status.

The investigation begins with the Ervin site because it is a useful case for highlighting problems of sample size and recovery in regional studies of Archaic mortuary variability. Salient aspects of

the Ervin sample serve as an initial focal point and are investigated in relation to other Archaic burial data sets in the region. This is a pattern recognition study combined with expectations derived from the G+A+S+R+O+C model in Section V.

Ervin, a Provocative Case

The Ervin site (40MU174) is a small shell midden located on the Duck River in the central Nashville Basin in middle Tennessee (Hofman 1983, 1984a, 1984b). The location of Ervin in relation to other Archaic burial sites discussed in this section is shown in Figure 7.1, with information on specific sites provided in Table 7.1. Radiocarbon dates which have been obtained from samples from the site, indicate that the shell midden accumulated between 7,000 and 5,500 years ago. During the final days of test excavation at Ervin in 1983, nine human burials were documented. Eight of these burials were recovered within a nine meter long section of a two meter wide transect excavated across the midden (Figure 7.2). The burials are all located near the center and highest portion of the midden. The final burial occurred some nine meters to the east of the first eight, and represents an infant or newborn. Surface indications of human bone and distinctive artifact types, like those found in association with the other burials, suggest that a portion of the site some 30 meters wide contains additional burials. If the burial density for the remaining unexcavated portion of this "burial area" is constant, then an estimated 100 to 135 burials may be present at the site. It is likely, in any event, that only a small

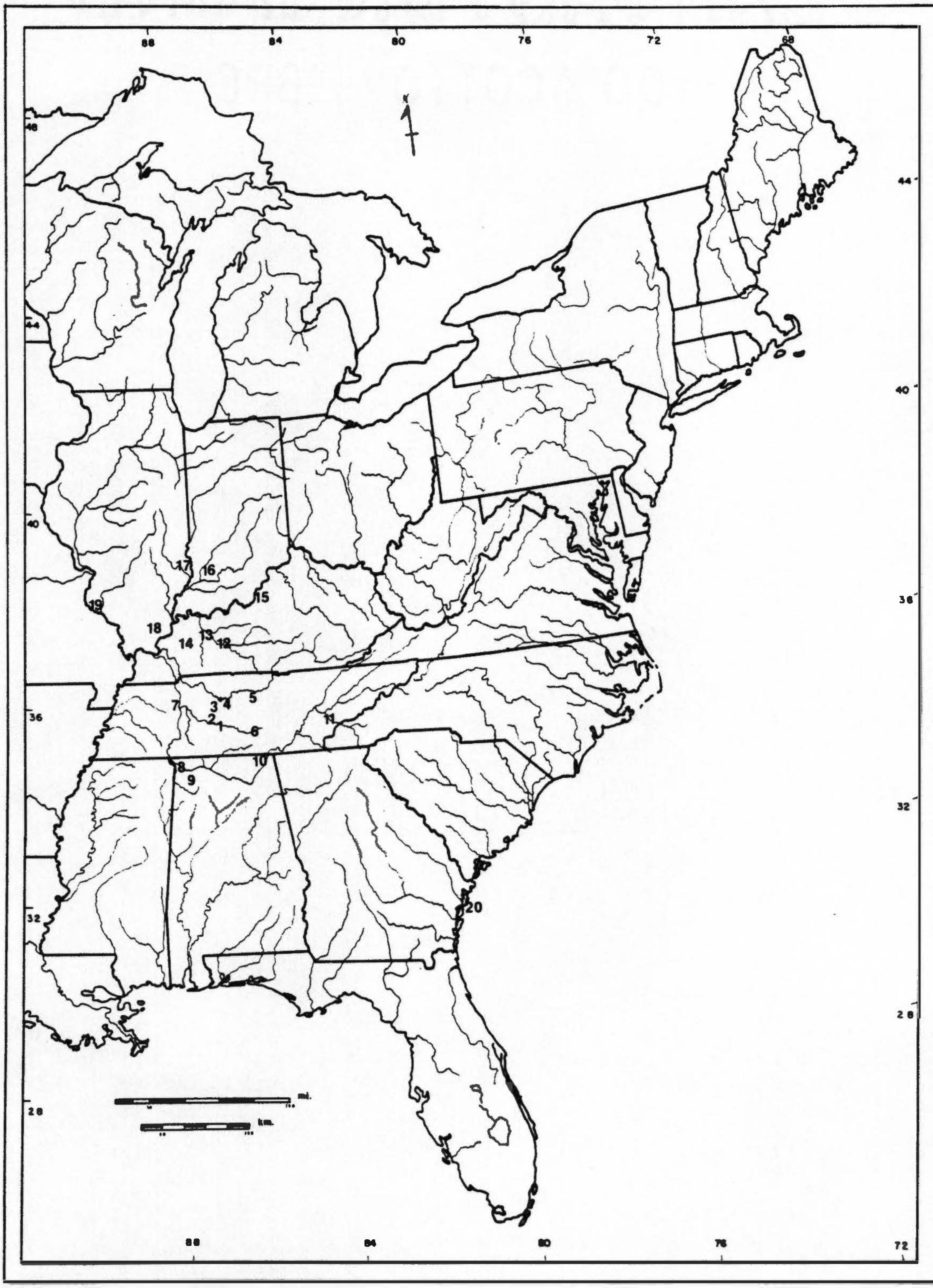



Figure 7.1. Location of selected Archaic mortuary sites in the Middle South and Midwest. Sites indicated by map numbers are identified in Table 7.1.

Table 7.1. Selected Archaic mortuary sites in the Middle South and and Midwest. Map numbers refer to Figure 7.1.

| Map # | Site Name | References |
|---|---|---|
| 1 | Ervin | Hofman 1985a |
| 2 | Fattybread Branch | Amick 1985 |
| 2 | Oldroy | Herbert 1985 |
| 3 | Anderson | Dowd 1981, Joerschke 1983 |
| 4 | Hart | Parker 1974 |
| 5 | Robinson | Morse 1967 |
| 6 | Aaron Shelton | Wagner 1982, Brown 1982a |
| 7 | Eva | Lewis and Lewis 1961, Magennis 1977 |
| 7 | Cherry | Magennis 1977 |
| 8 | Perry (Unit 1) | Webb and DeJarnette 1942 |
| 8 | Bluff Creek | Webb and DeJarnette 1942 |
| 8 | Long Branch | Webb and DeJarnette 1942 |
| 8 | Mulberry Creek | Webb and DeJarnette 1942 |
| 8 | Little Bear Creek | Webb and DeJarnette 1948 |
| 9 | Stanfield-Worley | DeJarnette, Kurjack, and Cambron 1962 |
| 10 | Russell Cave | Griffin 1974, Snow and Reed 1974 |
| 11 | Icehouse Bottom | Chapman 1977 |
| 11 | Iddins | J. Chapman 1981 |
| 11 | Patrick | Chapman 1977, Schroedl 1978 |
| 12 | Indian Knoll | Webb 1974 |
| 12 | Carlson Annis | Webb 1950a |
| 12 | Read | Webb 1950b |
| 13 | Barrett | Webb and Haag 1947 |
| 13 | Butterfield | Webb and Haag 1947 |
| 14 | Morris | Rolingson and Swartz 1966 |
| 15 | Rosenberger | Driskall 1979 |
| 16 | Jerger | Tomak 1979, 1983 |
| 17 | Riverton | Winters 1969 |
| 17 | Robeson Hills | Winters 1969 |
| 18 | Black Earth | Lynch 1982 |
| 19 | Modoc Rockshelter | Fowler 1959, Neumann 1967 |
| 20 | St. Catherines Island | Thomas and Larson 1979, Larson and Thomas 1982 |

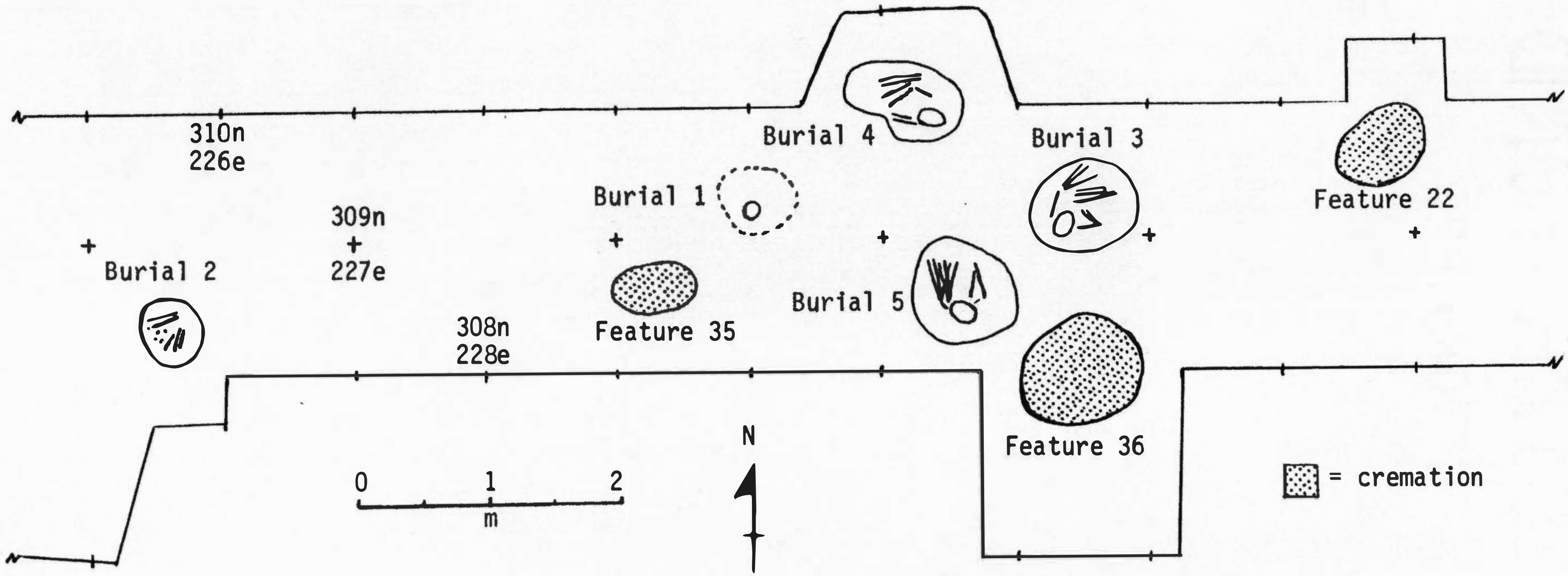



Figure 7.2. Distribution of burials in unit FTC at the Ervin site, 40MU174, Maury County, Tennessee.

percentage of the Ervin site burials are represented in the available sample. A description of the Ervin burials is provided here, and then the somewhat "unusual" nature of the Ervin sample is discussed. The Ervin burials provide a useful point of departure for a regional evaluation of the place of secondary burial during the Archaic.

Due to their shallow depth, all the burials at Ervin, with the possible exception of Feature 36, have been disturbed by modern cultivation, severe mechanical post-burial bone breakage has resulted from plowing. The limited amount of limestone and shell in this portion of the Ervin midden has contributed little to the bone preservation. Detailed osteological analyses of the skeletal remains are not yet available, but will provide only limited information because the remains are highly fragmented and poorly preserved.

Burial 1 was first encountered during excavation of a one meter test unit preparatory to plowzone removal from a two meter wide transect. This transect, FTC, produced all of the documented burials at Ervin, and was stripped to the base of the plowzone in a search for features. The burial consisted of scattered pieces of bone meal, some fragments of calcined bone, and the mealy outline of a cranial vault at the base of the plowzone. There was no distinct pit outline and nothing recovered in the area of concentrated bone fragments appeared to represent burial associations. Age, sex, and interment position of the individual are undetermined.

Burial 2 was encountered at the base of the plowzone, and had been severely disturbed by cultivation. No evidence of the skull was recovered, and it is assumed to have been crushed and dispersed by

plowing. Burial 2 represents an adult placed in a flexed position (Figure 7.3). As with the other flexed burials at Ervin, the long bones were badly fragmented and articular ends of long bones, vertebrae and other cancellous bone were generally not observed or recoverable. No distinct pit outline was discerned and no associations were in evidence. Position of the long bones suggests that the body was flexed with the femurs between about 70 and 90 degrees to the body.

Burial 3 (Figure 7.4), was also encountered at tne base of the plowzone with the top of the skull missing due to plow damage. The body was tightly flexed, laying on its left side with the knees and hands in front of the face. The angle of flexure was about 35 degrees. There were no apparent associations, and sex was undetermined.

Burial 4 was in very poor condition, with the skull represented only by highly fragmented, mealy pieces. The pelvic area was removed during the excavation of unit 309N-230E, and fragmentary long bones lacking articular ends indicated that the body had been placed in a flexed position on the right side with the femurs at about 30 degrees to the body. An Eva projectile point-knife with a broken tip was found just beneath the left humerus (Figure 7.5), and may represent an association or inflicted wound. It could, however, simply be a fortuitous association as such broken artifacts are common in the site fill.


Figure 7.3. Burial 2 from the Ervin site, 40MU174, Tennessee.

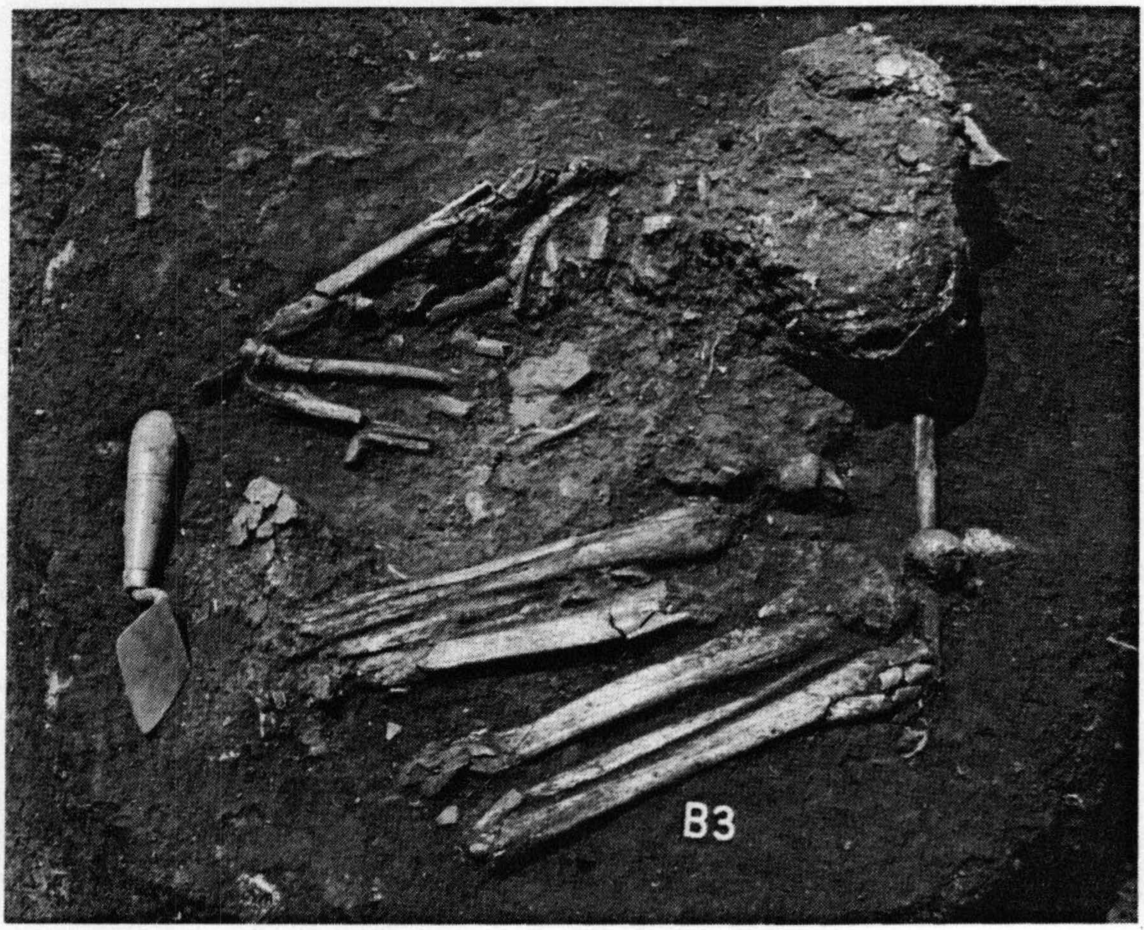



Figure 7.4. Burial 3 from the Ervin site, 40MU174, Tennessee.

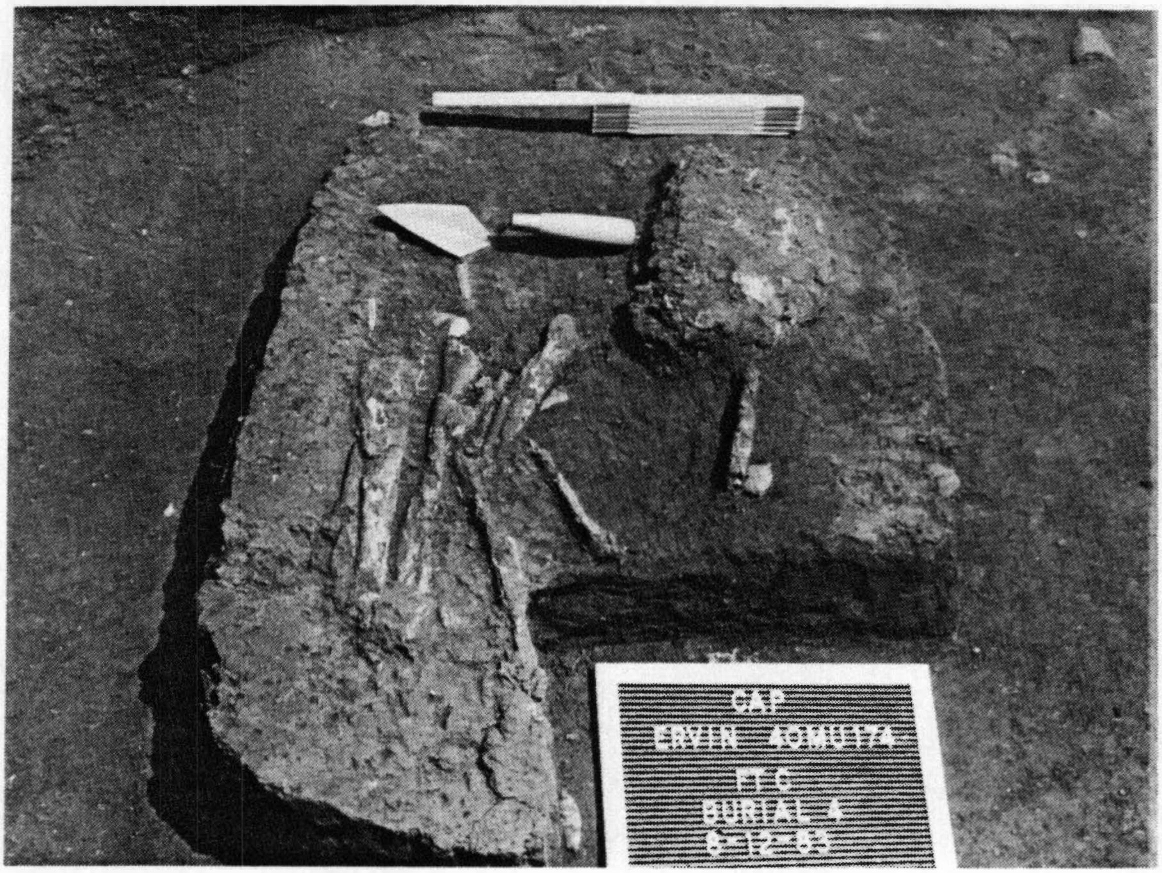



Figure 7.5. Burial 4 from the Ervin site, 40MU174, Tennessee.

Burial 5 (Figure 7.6) was comparatively well preserved, although the top of the skull had been removed by plowing and cancellous portions were represented only by meal. The individual appeared to have been placed on his back with the legs flexed such that the long bones came to rest on the left side with the knees near the left shoulder. The degree of flexure is approximately 30 degrees. The robustness of this individual suggests that it was a male. This is the only one of the flexed interments to have an unquestionable artifact association. A large, stemmed projectile point-knife in pristine condition was found on the upper chest in much the manner a pendant might be worn. The artifact exhibits attributes of both Benton and Sykes-White Springs projectile point types. These types are dated to between 5,700 and 6,200 radiocarbon years ago at Ervin (Hofman 1984a).

Feature 27 represents the burial of an infant or newborn. It was identified as a small bone concentration within a little basin formed by three small limestone slabs (Figure 7.7). These bones occurred slightly below the plow zone and the high density of shell and limestone in their immediate vicinity probably contributed importantly to the preservation of these small and fairly porous elements. The elements did not appear to be in anatomical order, and it is possible that the interment represents a bundle burial. An inventory of the elements recovered is provided in Table 7.2.

The three cremation burials encountered at Ervin have been briefly described elsewhere (Hofman 1985a). These burials were found interspersed with the flexed interments and all appear to represent

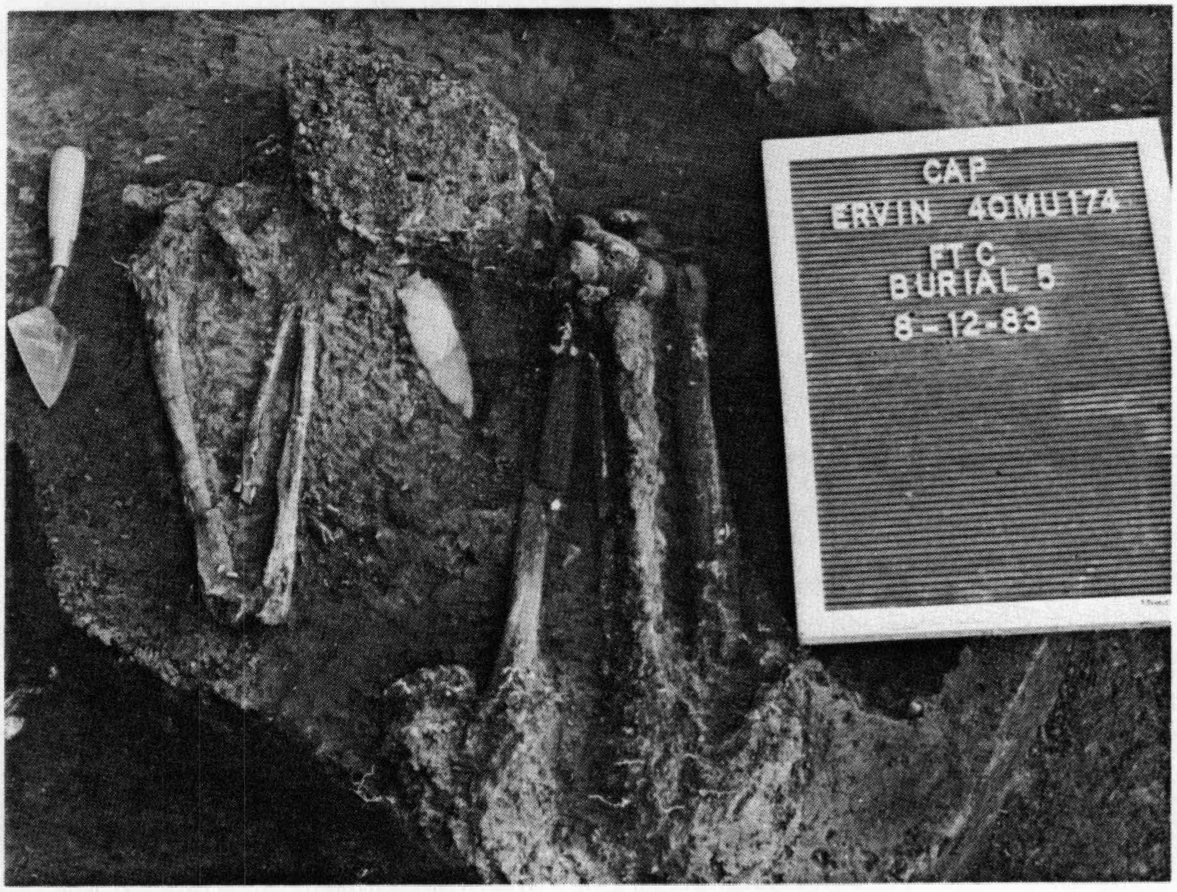



Figure 7.6 Burial 5 from the Ervin site, 40MU174, Tennessee.

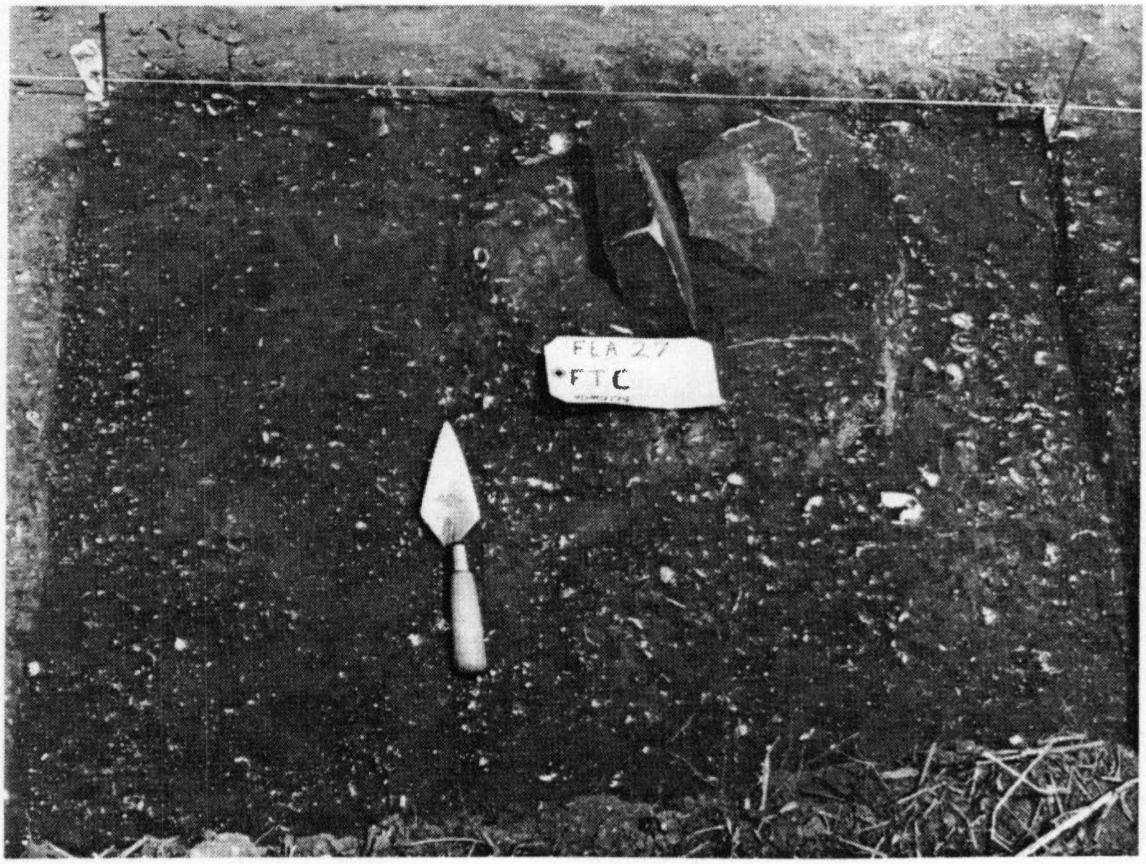



Figure 7.7. Feature 27, infant burial, Ervin site, 40MU174, Tennessee. The concentration of infant bones was within the three small limestone slabs.

Table 7.2. Inventory of infant bones from Feature 27, Ervin site.[1]

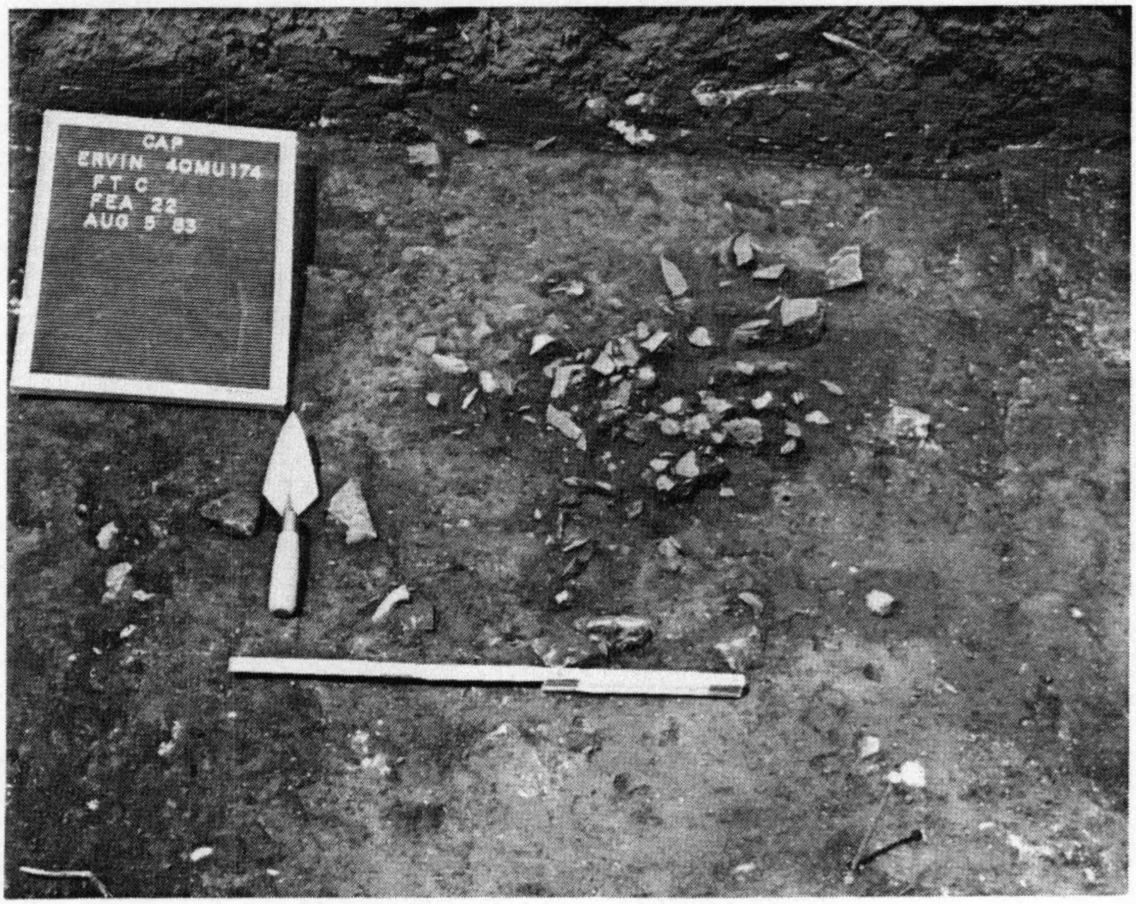
| Element | Portion and Count |
|---|---|
| Cranium | vault and facial fragments |
| Mandible | fragments |
| Incisor | 1/4 crown |
| Molar | bud |
| Vertebrae | 43 neural arches, 13 fragments, 24 bodies |
| Sternum | 2 manubrium centers |
| Ribs | 96 fragments |
| Scapula | fragments of left and right |
| Humerus | right (66 mm long)* |
| Radius | left (54 mm long)* |
| Ulna | right, fragment |
| Metacarpals | 8 |
| Hand Phalanges | 5 proximal |
| Innominate | left and right, fragmentary |
| Femur | right, fragmentary |

[1]Analysis by Henry Case, Department of Anthropology, The University of Tennessee-Knoxville.

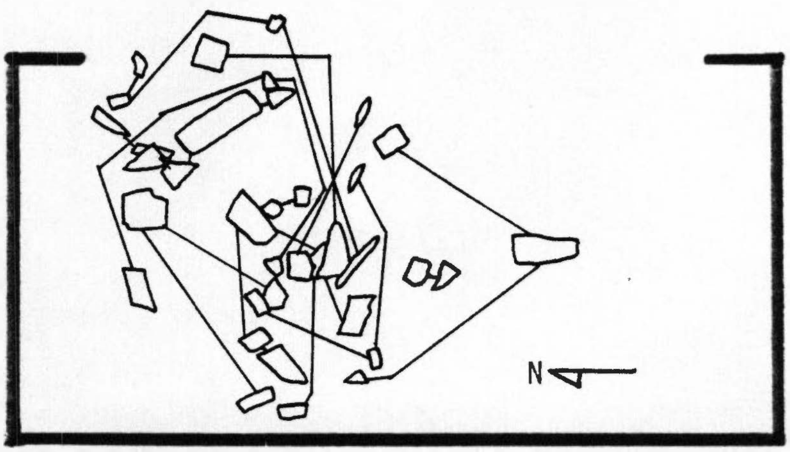
* Estimated age is about 39 weeks since last menstration.

secondary deposition of single individuals, as noted in Section VI. All the cremations were done in the flesh as indicated by the nature of warping and cracking of the calcined bone (Baby 1954; Binford 1972:375-376; Thurman and Willmore 1981). Exploded tooth enamel and the white calcined bone indicate that the cremations were burned in very hot fires, of more than 500 degrees C (Furuhata and Yanamoto 1967). The majority of the bone from each of the Ervin cremations appears to have been burned at temperatures comparable to Stage III and Stage IV of Shipman's scheme, that is, between temperatures of 525 degrees and about 900 degrees C (Shipman, Foster, and Schoeninger 1984:313-314). Based on artifacts found in association, the cremations appear to belong to the same cultural tradition as the flexed burials. Information on faunal associations and weights of recovered bone is also provided in Section VI. All the cremations were processed by flotation.

Feature 22 was the first cremation encountered and was revealed at the base of the plowzone. It was first observed as a concentration of burned bifaces (Figure 7.8). It should be noted here that all of the biface artifacts from Feature 22 and the other two cremations discussed below were manufactured from large pieces of Fort Payne chert and are of varieties not locally available in the site area. This material must have been acquired from sources at least as far away as the Highland Rim, 35 or more km distant. Feature 22 has been radiocarbon dated to 6160 175 B.P., and paleobotanical remains have been inventoried (Hofman 1984b:Table 5). The feature was excavated primarily with bamboo picks and brushes




a




b

Outlined area encompasses the east half of unit 309N-234E (1x.5 meters).

Figure 7.8. Feature 22, secondary cremation, Ervin site, 40MU174, Tennessee. a: View of second excavated layer of calcined bone and burned bifaces. b: Map of refitted biface fragments from Feature 22.

with special effort given to mapping in situ all pieces larger than one cm. The area of the fire-fractured biface concentration was about 60 cm in diameter, but no definable borders were discerned. Artifactual associations with Feature 22 were all intensively burned, and most were fire-fractured (Table 7.3; Hofman 1985a: Table 1.1). The most obvious artifacts were large triangular and bi-pointed bifaces (Figure 7.9; Hofman 1985a: Figure1.3). An estimate based on reconstructed fragments and base and tip fragments is that there were about 20 bifaces cremated with the individual. Other artifacts include approximately 100 freshwater shell beads of the genus Leptoxis (Hofman 1985a:Figure 1.4), some of these are ground flat on one surface so they could be fastened onto garments in a flush manner (Webb 1974:170). Two additional beads include one small tubular bone specimen and a thin square bead, probably of marine shell, which has been drilled its entire length through the thin edge. Four pieces of worked bone, apparently awl fragments, were also recovered. Animal bone was also associated with the cremation, and some of this was only partially burned or unburned (Table 6.3, page 112). Because there were no discrete limits to the cremation deposit, some of the small animal bone may simply represent midden debris from fill adjacent to the cremation.

Feature 35 was encountered at the base of the plowzone, in unit 308N-229E, where the plowzone was removed using pick and shovel. An amorphous dark stain containing fragments of burned bone and fire-fractured bifaces indicated the presence of a feature somewhat comparable to Feature 22. Much of this feature had been

Table 7.3. Summary listing of cremation associations at the Ervin site, 40MU174.

| Artifact Group | Feature 22 | Feature 35 | Feature 36 |
|---|---|---|---|
| Bifaces: | | | |
| bi-pointed | 6+ | 1+ | 0 |
| triangular | 11+ | 6+ | 0 |
| miscellaneous | 3+ | 0 | 3+ |
| Sykes-White Springs or Benton Points: | | | |
| complete/broken | 0 | 1/0 | 1/4+ |
| Siltstone Abrader: | 0 | 0 | 1 |
| Beads: | | | |
| freshwater snail (*Anculosa*) | 100+ | 0 | 25+ |
| mussell or clam shell* | 1 (square) | 0 | 6 (disc) |
| tubular bone | 1 | 0 | 1 |
| Bone Tools and Worked Bone | 4 | 0 | 20+ |
| Bannerstones | 0 | 0 | 3 |

\+ Counts of some categories are tentative due to the fragmentary condition of many items and pending further analysis.

* The square bead or small pendant from Feature 22 and the disc beads from Feature 36 *may* be made from marine shell.

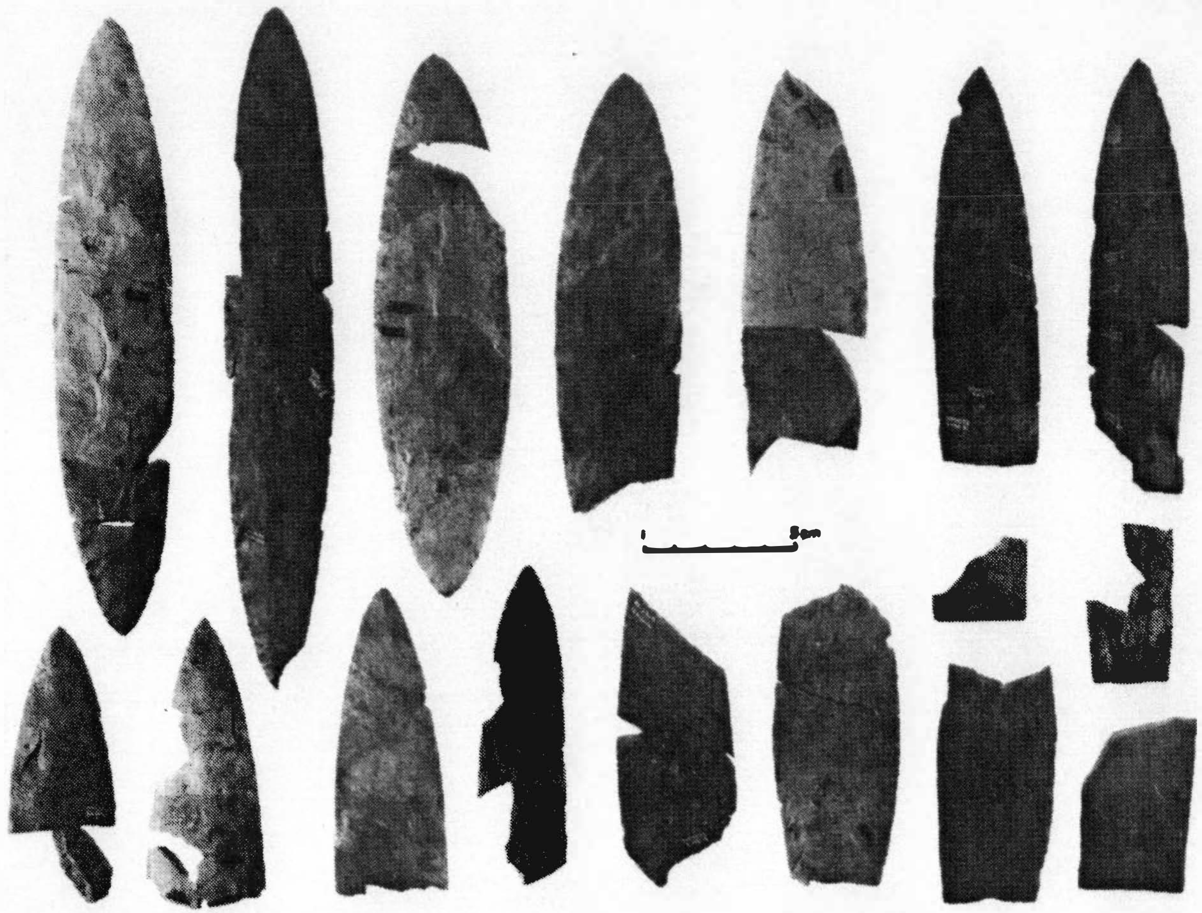


Figure 7.9. Examples of refitted bifaces from Ervin site Feature 22 Cremation.

plowed away leaving intact only the bottom six cm below the plowzone. Maximum dimensions of the cremation deposit were approximately 60 by 80 cm, with the greatest concentration of material in an area about 40 cm in diameter. Several large bifaces, probably at least seven, were represented in the feature fill by fire-spalled fragments. Also, a single large stemmed biface very similar to the one recovered from Burial 5 was included in the Feature 35 fill. It was broken during plowzone removal, but had not been fire-fractured (Figure 7.10; Hofman 1985a: Figure 1.5). This burial accompaniment is of special interest in that it was not cremated with the body but was apparently put with the remains at the time of final burial. The implications of differential timing for artifact contributions to the deceased are of importance here. First, unburned grave furniture may indicate that more than one individual or group gave offerings to the deceased. When only part of the offerings are burned, the addition of items after the cremation act may indicate that either the person(s) making the offering or the material(s) offered was (were) not present at the time of cremation. In situations where final burial occurs at a time of aggregation of previously fissioned groups, we might expect such associations of burned and unburned offerings to be repeatedly in evidence. In such cases, burial offerings in the same grave may exhibit different sets of distinctive technological attributes and/or raw material sources (e.g., Binford 1963a:190, 1963b:142).

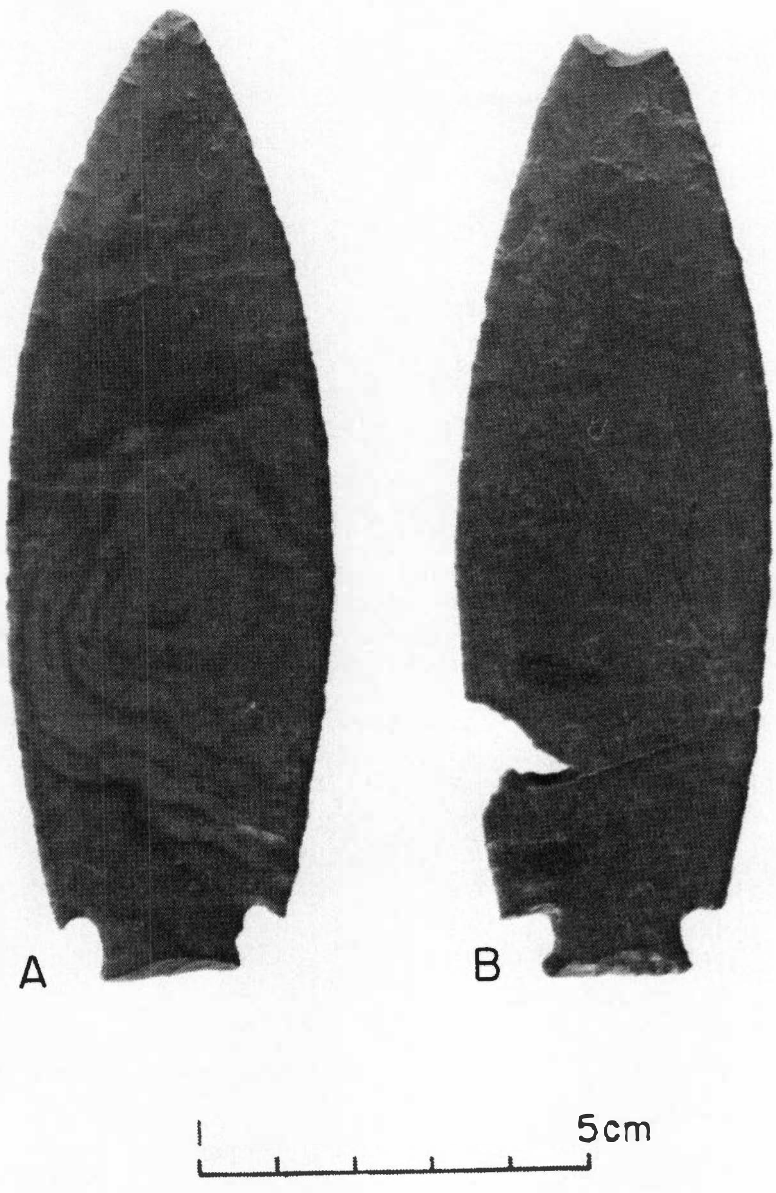



Figure 7.10. Unburned stemmed bifaces of Benton or Sykes-White Springs types from Ervin site burials. a: Projectile point-knife from Burial 5. b: Projectile point-knife from Feature 35 cremation.

The final secondary cremation, Feature 36, was excavated on the last day of field work which made it impossible to piece plot all items. The feature was, however, encountered between 30 and 35 cm below the surface during shovel skimming at the base of and below the plow zone, and so represents the only essentially intact cremation burial excavated at Ervin. The boundaries of the feature were relatively distinct and the fill, with a maximum depth of about 30 cm, was very dark, organically enriched, and had a greasy feel. A variety of artifacts were found in Feature 36 (Figure 7.11, Table 7.3; Hofman 1985a:Figure 1.6). More than 20 bone awls and other modified bone pieces, exhibiting various amounts of burning were recovered as was an unburned siltstone abrader. Fire-fractured pieces of at least three bannerstones were recovered; two were made of limestone and one of hematite. Three varieties of beads were recovered: beads from freshwater snails (Leptoxis), shell disc beads, and a small tubular bone bead. Fire broken projectile points of the Sykes-White Springs cluster and several spalled biface fragments were also recovered. Finally, a complete Sykes-White Springs point was found in the heart of the deposit and showed no evidence of thermal alteration. This is an interesting parallel to the unburned projectile point-knife from the Feature 35 cremation.

The Ervin site burial information can be summarized as follows. A total of nine human interments is represented, one being of indeterminate form and another representing an infant. The remaining seven burials include four flexed adult individuals which were primary interments and three cremated individuals who were

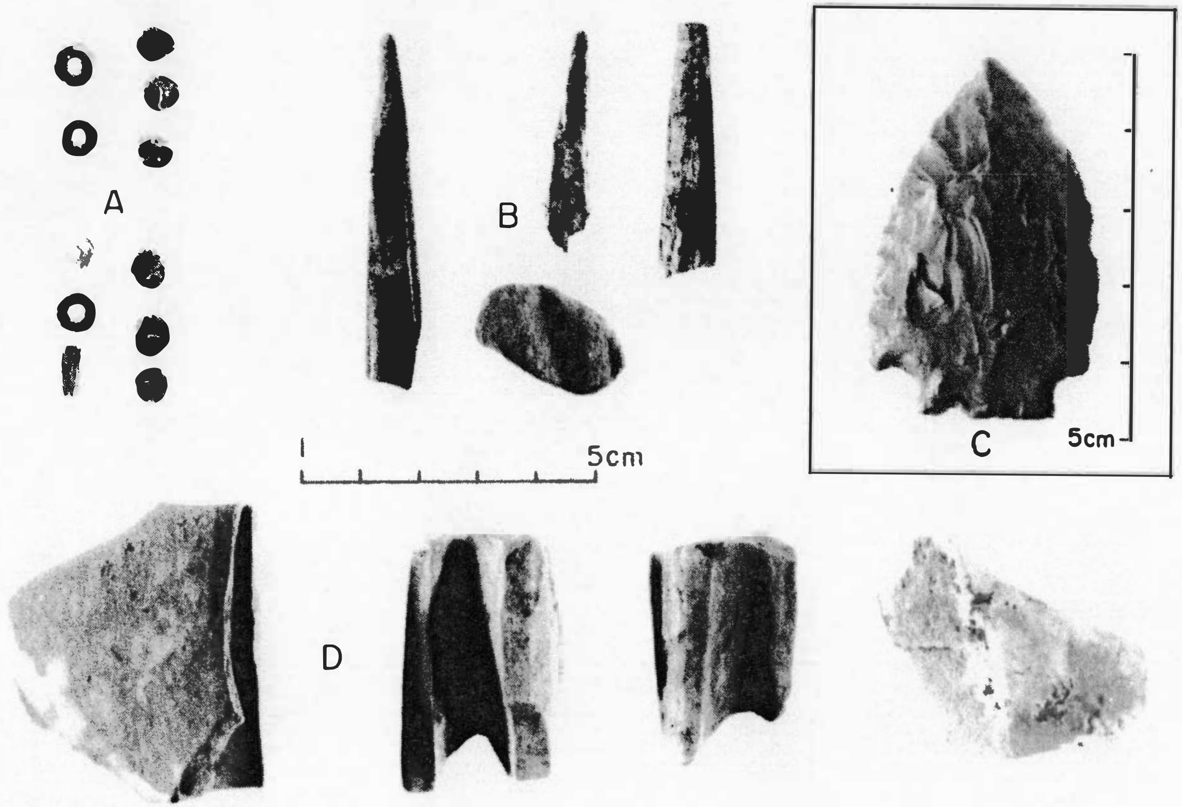



Figure 7.11. Examples of artifacts recovered from Ervin Feature 36 cremation.

deposited as secondary burials. The burials occurred in a restricted portion of the Ervin site, and although closely spaced, none appeared to have been disturbed by aboriginal digging. Overlapping features in other areas of the site, in combination with several radiocarbon dates and diagnostic artifact styles, indicate that the site was utilized repeatedly during a period of at least 1000 years. The facts that the burials are clustered, and that closely comparable diagnostic artifacts were found both with cremations and flexed interments, suggest that all or most of the burials represent the same cultural tradition or lineage. This basic kind of patterning, with clustered burials and evidence of repeated occupation, is evident at other Archaic sites in the Middle South (e.g., Amick 1985; Morse 1967; J. Chapman 1981:Figure 59; Webb and Haag 1947:14).

In the event that the small burial sample from Ervin is in any way representative of the the site pattern as a whole, there are several distinctive aspects of this sample which give cause for further investigation of the significance of site and regional Archaic mortuary variability. These include the high proportion of cremations, the high proportion of secondary burials, and the high proportion of burials with associations. Because of the size limitations of the Ervin sample, these concerns are most appropriately investigated at a regional level (Buikstra 1976, 1981).

## Ervin Mortuary Activity in Regional Perspective

Table 7.4 lists the frequency of burial types at selected Archaic sites located in the Middle South and Midwest, and serves to indicate the somewhat unusual nature of the Ervin sample. Several sites--Aaron Shelton, Iddins, Icehouse Bottom, Patrick and Jerger--have higher frequencies of secondary burial than Ervin. Differences of preservation, however, render these samples incomparable on a direct basis. Aaron Shelton, Iddins, Icehouse Bottom, and Jerger represent non-shell midden deposits where calcined bone was preserved, but where unburned remains of in-the-flesh burials would not have been, or were not, preserved in good enough condition to allow study. The Patrick site sample includes burials of uncertain cultural assignment (Schroedl 1978). Of the remaining sites, Ervin stands out as having the highest proportion of secondary burials, all of which are cremations.

As discussed in Section VI, variation in field recovery techniques is believed to be at least partially responsible for this discrepancy. Table 7.4 notes the nature of recovery techniques used at the various sites. The presence of relatively large and unusual artifacts in the Ervin cremations aided recognition of the distinctiveness of these features in the field. Given coarser recovery techniques (e.g., 1/2 inch screening or no screening of the feature fill) these features may not have been recognized as human burials at all, especially given the presence within each of relatively large and less severely burned or unburned pieces of bone from various animal species (see Section VI). The presence of animal

Table 7.4. Burial type frequencies for selected Archaic sites in the Middle South and Midwest.

| Site Name | Recovery* | No. of Archaic Burials | No. of Burials with Data | PRIMARY BURIALS:* | | | | SECONDARY BURIALS:* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | flex. | extend. | other | % | crem. | bund. | dism. | % |
| Ervin | F, 1/16" | 9 | 7 | 4 | - | - | 57.1 | 3 | - | - | 42.9 |
| Fattybread | 1/16" | 16 | 7 | 4 | 1 | - | 71.4 | 2 | - | - | 28.6 |
| Oldroy | 1/16" | 73 | 73 | 70 | 1 | - | 97.0 | - | - | 2 | 3.0 |
| Anderson | 1/2" | 73 | 62 | 54 | 1 | - | 88.7 | 3 | 4 | - | 11.3 |
| Robinson | n s | 62 | 56 | 54 | 1 | - | 98.2 | - | 1 | - | 1.8 |
| Aaron Shelton | 1/4" | 1 | 1 | - | - | - | 0 | 1 | - | - | 100 |
| Eva | n s | 180 | 153 | 139 | 8 | - | 96.1 | 2 | 4 | - | 3.9 |
| Cherry | n s | 73 | 73 | 71 | 1 | - | 98.6 | 1 | - | - | 1.4 |
| Perry | n s | 141 | 99 | 94 | 2 | - | 97.0 | 2 | 1 | - | 3.0 |
| Bluff | n s | 182 | 100 | 90 | - | 2 | 92.0 | 8 | - | - | 8.0 |
| Long Branch | n s | 93 | 66 | 61 | 1 | - | 94.0 | 4 | - | - | 6.0 |
| Mulberry Creek | n s | 134 | 80 | 61 | 10 | 1 | 90.0 | 8 | - | - | 10.0 |
| Little Bear Creek | n s | 136 | 123 | 103 | 2 | 10 | 93.5 | 4 | 4 | - | 6.5 |

Table 7.4. (continued)

| Site Name | Recovery* | No. of Archaic Burials | No. of Burials with Data | PRIMARY BURIALS:* flex. | extend. | other | % | SECONDARY BURIALS:* crem. | bund. | dism. | % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Stanfield-Worley | 1/4" | 11 | 9 | 6 | - | - | 66.7 | - | 3 | - | 33.3 |
| Russell Cave | 1/4" | 6 | 3 | 2 | - | - | 66.7 | - | 1 | - | 33.3 |
| Icehouse Bottom | 1/16" | 2 | 2 | - | - | - | 0 | 2 | - | - | 100 |
| Iddins | 1/16" | 4 | 4 | - | - | - | 0 | 4 | - | - | 100 |
| Patrick | 1/16" | 11 | 11 | 6 | - | - | 54.5 | 1 | 2 | 2 | 45.5 |
| Indian Knoll | n s | 880 | 792 | 758 | 11 | - | 96.8 | - | ? | 25 | 3.2 |
| Carlson Annis | n s | 390 | 340 | 329 | 1 | - | 97.1 | - | 3 | 7 | 2.9 |
| Read | n s | 247 | 233 | 230 | 6 | - | 98.7 | - | - | 3 | 1.3 |
| Barrett | n s | 412 | 361 | 272 | 20 | 29 | 88.9 | - | 33 | 7 | 11.1 |
| Butterfield | n s | 153 | 92 | 71 | 9 | - | 87.0 | - | 12 | - | 13.0 |
| Morris | n s | 28 | 27 | 27 | - | - | 100 | - | - | - | 0 |
| Rosenberger | 1/4" | 182 | 107 | 89 | 7 | - | 89.7 | - | 11 | - | 10.3 |
| Jerger | ? | 4 | 4 | - | - | - | 0 | 4 | - | - | 100 |
| Riverton | n s | 3 | 3 | 2 | - | - | 66.7 | 1 | - | - | 33.3 |

Table 7.4. (continued)

| Site Name | Recovery* | No. of Archaic Burials | No. of Burials with Data | PRIMARY BURIALS:* | | | | SECONDARY BURIALS:* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | flex. | extend. | other | % | crem. | bund. | dism. | % |
| Black Earth | 1/2" | 154 | 122 | 65 | 57 | - | 100 | - | - | - | 0 |
| Modoc Rockshelter | 1/2" | 29 | 19 | 12 | - | - | 63.2 | - | 3 | 4 | 36.8 |
| Robeson Hills | n s | 6 | 4 | 2 | 2 | - | 100 | - | - | - | 0 |

* Abbreviations under recovery are as follows: F = flotation, n s = not screened, and fractions indicate screen mesh size in inches. Abbreviations under primary burials are: flex = flexed, extend = extended. Abbreviations under secondary burials are: crem = cremation, bund = bundle burial, and dism = dismembered (often represented by few skeletal elements).

bone refuse in cremation deposits may be especially troublesome in camouflaging the occurrence of cremations when distinctive artifact associations are not recovered.

Given these observations, the frequencies of secondary cremation burials are expected to be significantly under-represented from some sites in the region. We might also expect that cremation burials with numerous artifacts have been recognized and reported in greater relative frequency, as compared to cremations without associations, than they are actually represented in the archaeological sites. When all forms of secondary burials are considered, a consistently small percentage (usually less than 10 percent and rarely more than 30 percent) of secondary interments is evident at most sites in the Middle South (Table 7.4).

In the Ohio River drainage basin, however, several Archaic sites stand out as having no reported secondary burials. These include Morris, Black Earth, and Robeson Hills, and in the case of the Black Earth site, this is not likely to be a problem of sampling error or preservation and recognition. Given the G+A+S+R+O+C model of hunter-gatherer mortuary variability (Section V), the rare occurrence of secondary burial is expected to correlate with relatively permanent habitation and fairly small territory size. Jefferies (1982; Jefferies and Lynch 1983) has argued from several lines of evidence that the Black Earth site was occupied on a year-round basis. This is in accord with the burial pattern. It is possible that other similar sites were permanently occupied on a rotational basis by the same group (lineage) during the 1000 or more

years during which Middle Archaic people used the Black Earth site. Janzen (1977) has argued that other Archaic midden sites in the Ohio Valley represented permanent, rather than seasonal, habitation sites. It is documented, however, that earlier Archaic people in the Wabash River Basin used secondary burial as evidenced by secondary cremations at the Jerger site (Tomak 1979, 1983). Also, a secondary cremation at the Riverton site (Winters 1969) documents the continuation of this practice during the Late Archaic. This variability in the Ohio Basin Archaic mortuary activity may reflect differences in organization and mobility patterns between groups, and through time, in different areas as could result from differing economic situations.

In the Tennessee River Basin, secondary cremation burial is of widespread but generally limited occurrence (Table 7.5). Ervin is again notable for the high proportion of secondary cremations. Excluding those sites where, due to preservation, non-cremated remains were not recovered, Ervin has the highest relative frequency of secondary cremations. The relative frequency of secondary burial at Ervin is compatible with the interpretation that the Middle Archaic peoples who occupied the site were utilizing a large economic territory and spent a significant portion of the year as dispersed subsistence groups. They may periodically have gathered together at predetermined places at specified times to conduct a variety of aggregate activities (Hofman 1984b:170-173). A plausible accommodative argument, given the G+A+S+R+O+C model, is that the Ervin site represents a preferred burial location of a hunter-

Table 7.5. Archaic secondary cremation burials in the Middle South.

| Site Name | Number of Secondary Cremations | % of Total Burials of Determinant Type | Cremations with Associations | Associations Burned | Associations Unburned | Total of all Burials at site with associations |
|---|---|---|---|---|---|---|
| Ervin | 3 | 42.9 | 3 (100%) | x | x | 4 (44.4%) |
| Fattybread | 2 | 28.6 | 1 (50%) | x | - | 3 (21.4%) |
| Anderson | 3 | 11.1 | 3 (100%) | x | x | ? |
| Aaron Shelton | 1 | 100 | 1 (100%) | ? | ? | 1 (100%) |
| Eva | 2 | 1.3 | 0 | - | - | 57 (31.66%) |
| Cherry | 1 | 1.4 | 0 | - | - | ? |
| Perry | 2 | 2.0 | 0 | - | - | 52 (37%) |
| Bluff | 8 | 6.9 | 1 (12.5%) | x | - | 33 (16.8%) |
| Long Branch | 4 | 6.0 | 0 | - | - | 26 (28%) |
| Mulberry Creek | 8 | 10.0 | 0 | - | - | 27 (20.1%) |
| Little Bear Creek | 4 | 3.3 | 3 (75%) | x | x | 30 (24.4%) |
| Jerger | 4 | 100 | 4 (100%) | x | ? | 4 (100%) |
| Riverton | 1 | 33.3 | 1 (100%) | x | - | 2 (66.7%) |
| Icehouse Bottom | 2 | 100 | 0 | - | - | 0 |
| Iddins | 4 | 100 | 1 (25%) | x | - | 1 (25%) |
| Patrick | 1 | 9.0 | 0 | - | - | 1 (9.1%) |

gatherer group which was dispersed into residentially mobile subgroups for part of the year. Occupation of the Ervin site may have been by an aggregate group which used the site as the base for daily foraging and logistical activities during some segment(s) of the economic cycle. During such periods Ervin would also have been the scene of group ritual and social activities including the final burial of the deceased. The secondary burials would represent individuals who had died during periods of group fission and were brought to Ervin at the time of aggregation for final burial.

A potential problem with this scenario is that all three Ervin cremations contained a number of burial associations. It might, therefore, be argued that the cremated individuals were high status individuals given special treatment solely because of their status (Tainter 1977, 1978, 1980). Given the small sample at Ervin, however, it is wise to also consider this problem from a larger, regional perspective.

## Extra Energy Without Extra Status?

Table 7.5 lists the Archaic cremation burials for the Middle South and the frequency of cremations with grave associations. It is obvious that, of the 50 cases listed, the majority do not have associations (n=32, 64 percent). On a regional basis, then, about 36 percent of the reported secondary cremations in the Middle South have burial offerings. If we use the nature and quantity of artifactual associations, as is conventional, for assessments of status differentiation, then certainly most cremated individuals had "low

status" if non-perishable artifacts are useful indicators. The frequency of cremations with burial accoutrements compares to an overall occurrence of burials having associations of 25.7 percent, for all burials from these same sites. A confounding factor, as noted above, is that cremations with large or otherwise obvious associations are more likely to be recognized as secondary burials than cremations lacking associations and consisting only of a small concentration of calcined bone. Based on the nature of available regional data concerning cremations, we do not have an unambiguous method for determining if cremation was, in and of itself, a status indicator in the Middle South during the Archaic. There is, however, considerable variation in the kinds and quantities of associations found with cremations. It is evident that if cremation was a form of status differentiation, as the "extra energy--extra status" model might be construed to imply, then cremation was used interactively with a variety of other indicators.

The lack of a direct link between cremation and status is evident in the fact that the types of artifacts recovered from the Ervin cremations have repeatedly been found at contemporary sites in the region in association with uncremated burials. Large bifacial blades, projectile point-knives, freshwater shell beads, shell disc beads, bannerstones, and bone tools have repeatedly been recovered with Middle and Late Archaic primary flexed interments in the region (Dowd 1985; Futato 1983; Morse 1967; Lewis and Lewis 1961; Webb 1950a, 1950b, 1974). Two of the cremations at Ervin produced large bifacial triangular and bipointed knives or blanks (Hofman 1985a).

Very similar specimens were recovered from 18 burials at the Hart site (Parker 1984) and from one burial at the Anderson site (Dowd 1985). All of these bifaces were unburned and found with primary interments. If such artifacts reflected similar status emblems, then this suggests that factors other than status differentiation may be indicated by the different mortuary treatments.

Before leaving the topic of secondary cremations and considering secondary burial in general, it is appropriate to note the apparent absence of secondary cremation burials at the Archaic shell midden sites on the Green River in western Kentucky (Webb 1950a, 1950b, 1974; Webb and Haag 1947). More recent work at the Carlson Annis site (Marquardt and Watson 1983; Marquardt 1985; Robbins 1977:15) has also failed to produce evidence of cremation burials. This absence is especially noteworthy in light of the presence of cremation burials to the north and south of the Green River area which occur before and after the time of the Green River sites (J. Chapman 1981; Hofman 1985a; Tomak 1979, 1983; Webb and DeJarnette 1942; Winters 1969). Because all but the most recent work at the western Kentucky shell middens was conducted without screening the fill, it is tempting to speculate that the absence of reported cremations is due to the nature of the recovery. Several factors, however, argue against this. First, the sheer quantity of excavated fill and number of features encountered at these sites would imply that cremations, if present, would have been found. Cremations were encountered and documented using similar techniques in the middle Tennessee River Valley of northern Alabama. Finally, the more recent

and finely controlled work at these sites, though comparatively limited in extent, has produced no evidence of cremation (Marquardt 1984, personal communication). It is certainly possible, given the unspectacular nature of cremation remains, especially when no artifacts are in association or when the artifacts are severely fire damaged, that cremations were encountered during the early work on the western Kentucky sites and simply were not recorded as such in the sometimes sketchy reports. The different distribution of cremation burials in the shell mound Archaic of the Middle South as presently documented remains without a satisfactory explanation. This difference is one of several documented between the Archaic sites of the Tennessee Valley and those in western Kentucky (Lewis and Kneberg 1959: Tables 1,2).

## Secondary Burial, Status or Logistics?

Consideration will now turn to secondary burial in the Archaic of the Middle South in general, rather than just the occurrences of secondary cremation burial. If the "extra energy--extra status" model is viable for the Archaic hunter-gatherers in the Middle South, then we might predict a relationship between such treatment and the occurrence of burial associations, and especially non-utilitarian burial associations. Table 7.6 provides summary data concerning the frequency of occurrences of burial accompaniments in general and for secondary burials as a separate group. This information is tallied from reports pertaining to 3,137 burials from 23 sites in the Middle South and Midwest. I have included these sites because information

Table 7.6. Frequency of burial association occurrences for those sites having secondary burials.

| Site Name | No. of Archaic Burials | No. of Burials with Data | No. of Burials with Assoc. | No. of Burials with Non-utilitarian Associations | No. of Secondary Burials | Secondary Burials with Assoc. | Secondary Burials with Non-utilitarian Associations |
|---|---|---|---|---|---|---|---|
| Ervin | 9 | 7 | 4 | 2 | 3 | 3 | 2 |
| Fattybread | 16 | 7 | 2 | 1 | 2 | 1 | 1 |
| Robinson | 62 | 56 | 12 | 5 | 1 | 0 | 0 |
| Eva | 180 | 153 | 57 | 9 | 6 | 0 | 0 |
| Perry | 141 | 99 | 52 | 27 | 3 | 1 | 1 |
| Bluff | 182 | 100 | 22 | 6 | 8 | 1 | 1 |
| Long Branch | 93 | 66 | 25 | 19 | 4 | 0 | 0 |
| Mulberry Creek | 134 | 80 | 27 | 9 | 8 | 0 | 0 |
| Little Bear Creek | 136 | 123 | 30 | 25 | 8 | 3 | 3 |
| Stanfield-Worley | 11 | 11 | 4 | 0 | 3 | 0 | 0 |
| Russell Cave | 6 | 6 | 0 | 0 | 1 | 0 | 0 |
| Icehouse Bottom | 2 | 2 | 0 | 0 | 2 | 0 | 0 |
| Iddins | 4 | 4 | 1 | 0 | 4 | 1 | 0 |
| Patrick | 11 | 11 | 1 | 0 | 5 | 0 | 0 |
| Indian Knoll | 880 | 792 | 275 | 198 | 25 | 3 | 3 |
| Carlson Annis | 390 | 337 | 215 | 158 | 10 | 1 | 0 |
| Read | 247 | 233 | 61 | 37 | 3 | 0 | 0 |
| Barrett | 412 | 361 | 108 | 49 | 40 | 2 | 1 |
| Butterfield | 153 | 92 | 16 | 4 | 12 | 0 | 0 |
| Morris | 28 | 27 | 8 | 0 | 0 | 0 | 0 |
| Jerger | 4 | 4 | 4 | 2(?) | 4 | 4 | 2 (?) |

Table 7.6. (continued)

| Site Name | No. of Archaic Burials | No. of Burials with Data | No. of Burials with Assoc. | No. of Burials with Non-utilitarian Associations | No. of Secondary Burials | Secondary Burials with Assoc. | Secondary Burials with Non-utilitarian Associations |
|---|---|---|---|---|---|---|---|
| Riverton | 3 | 3 | 2 | 1 | 1 | 1 | 0 |
| Robeson Hills | 6 | 4 | 2 | 1 | 0 | 0 | 0 |
| Modoc | 29 | 19 | 4 | 1 | 7 | 1 | 1 |
| Grand Totals | 3139 | 2497 | 932 | 554 | 160 | 22 | 15 |

Summary Statistics: 29.69% of all burials have associations, 37.32% of burials with information on interment type have associations, 59.44% of burials with associations have non-utilitarian associations, 6.41% of burials with information on interment type are secondary, 13.75% of secondary burials have associations, 68.18% of secondary burials with associations have non-utilitarian associations, 9.37% of secondary burials have non-utilitarian associations, 38.94% of primary burials have associations, 23% of all primary burials have non-utilitarian associations, 59.23% of primary burials with associations have non-utilitarian associations.

on them is accessible and the numbers can be reassessed by those interested in specific cases or problems. In numerous situations judgments as to whether to include burials and what to consider a burial association will result in minor variations in the frequency of categories for particular sites. For example, for the Bluff site in northern Alabama (Webb and DeJarnette 1942:107-119) most of the 197 burials were assignable to the Shell Mound Archaic components. There are, however, 15 extended burials at the site, several of which are associated with Mississippian pottery or projectile points, which are excluded from Table 7.6. It was not generally feasible, however, to individually evaluate each burial from each site as to its true component assignment. Also, frequencies of burial associations sometimes conflicted between written descriptions and tabular summaries so that decisions had to be made on limited information. It is assumed that the use of many cases and numerous sites, though including various reporter biases, will serve to override the potential ambiguities and produce an overall pattern which has interpretive significance for regional Archaic burial practices.

For the total of all burials, about 30 percent are reported as having grave furniture (this does not include most cases where only red ochre was present, as this substance was not consistently treated as part of the burial artifact listings). When considering only those burials for which specific information as to burial treatment (e.g., primary versus secondary) is provided, the proportion of burials with associations amounts to about 37 percent. These figures are very similar to those given above when only secondary cremation

burials were being considered. For those burials with associations, about 60 percent have what are here considered "non-utilitarian" artifacts. Non-utilitarian artifacts include, for the purposes of this study, ornaments such as beads, pendants, perforated teeth, gorgets, carapace rattles, whistles (though these might represent game calls) and such items which are assumed not to have been used in actual resource procurement-processing activities. Atlatl weights, projectile points, blanks, axes, pestles, awls and so forth are here considered utilitarian.

Secondary burials, at least those reported as or interpretable as being secondary, constitute only about six percent of the total burials of determinant form. Only 22 of the reported 160 secondary burials (about 14 percent) have associations of any kind. This is a considerably smaller percentage of burials with offerings than when the total burial sample, including about 30 percent with associations, is considered. For the 22 secondary burials with associations, 16 or almost 73 percent have non-utilitarian items. This is more than the 60 percent of primary burials having non-utilitarian items, when all primary burials with associations are considered (539 of 910 burials with associations have non-utilitarian artifacts). The small size of the secondary burial sample, however, precludes assigning any significant difference to this relative distribution of non-utilitarian burial associations.

It can be argued, however, based on chi-square analyses that secondary burials <u>do not</u> have a significantly greater frequency of burial associations than primary burials. In fact, it is documented

in Table 7.7 that secondary cremations and bundle burials have a significantly smaller than expected frequency of associations when the Middle South is considered on a regional basis. Furthermore, by cross-tabulating the occurrences of non-utilitarian artifacts for both primary and secondary burials which have associations (Table 7.8), we find no significant difference in the distribution of non-utilitarian grave artifacts between primary and secondary burials. These findings, therefore, lend support to the interpretation that secondary burial in the context of Archaic hunter-gatherers in the Middle South United States is not directly linked to status differentiation. At least it is not linked with status in the same manner as non-perishable grave associations. It is reasonable to assume, then, that other factors operated to determine the practice of secondary burial. It is suggested here that these other factors would have included circumstances such as the season and location of the person at the time of death, and the overall organization of the cultural group.

## Aggregations, Family Groups, and Mortality Distributions

Several aspects of the archaeological record in the Middle South are not conducive to direct evaluation of some predictions which have been generated from the G+A+S+R+O+C model of hunter-gatherer mortuary variability. For example, because of the limited sample of secondary burials from the region, the likelihood that not all secondary burials have been recognized as such, and the limited information which is available for most known cases, it is not

Table 7.7 Crosstabulation of primary and secondary burials by occurrences of grave associations.

| Grave Associations | Burial Type: Secondary | Primary | Totals |
|---|---|---|---|
| Present | o=22<br>e=59.72<br>$X^2$=23.82 | o=910<br>e=872.28<br>$X^2$=1.63 | 932 |
| Absent | o=138<br>e=100.28<br>$X^2$=14.19 | o=1427<br>e=1464.72<br>$X^2$=0.97 | 1565 |
| Totals | 160 | 2337 | 2497 |
| df=1 | $X^2$=40.61 | $p < .001$ | |

Table 7.8. Crosstabulation of primary and secondary burials by type of burial association.

| Type of Association | Burial Type: Secondary | Primary | Totals |
|---|---|---|---|
| Non-utilitarian Artifacts Present | o=15<br>e=13.08<br>$X^2$=0.28 | o=539<br>e=540.92<br>$X^2$=.003 | 554 |
| Utilitarian Artifacts Only | o=7<br>e=8.92<br>$X^2$=.41 | o=371<br>e=369.08<br>$X^2$=.01 | 378 |
| Totals | 22 | 910 | 932 |

df=1 $X^2$=0.703 not significant at .05 level

presently possible to effectively evaluate differences in the age and sex distribution of secondary burials. As indicated in Sections V and VI, it is expected that quantitative differences in the age and sex distributions of secondary burials would result from logistical versus residential mobility. For residentially mobile groups which periodically aggregated with other similar groups, it is expected that a cross-section of these family groups, and so of the overall population, would be represented as secondary interments at preferred burial sites such as aggregation sites.

For logistically organized groups occupying permanent or relatively long-term habitation sites, it is expected that individuals engaged in long-distance movements and hazardous activities away from the habitation site would represent individuals most likely to have been interred in the burial area as secondary burials. For logistically mobile hunter-gatherers in the eastern United States, it is probable that hunters, traders, and members of raiding parties would have been most likely to die at a distance from habitation sites. It is probable, given these expectations, that logistically organized hunter-gatherers will have a higher frequency of active adult males occurring as secondary burials (in relation to other age and sex groups), than will more residentially mobile groups in which <u>all</u> members, rather than a limited subset, spend a significant amount of time away from sites of aggregation and preferred burial.

In line with such expectations, it has been suggested that Archaic shell midden sites in the Middle South represent likely candidates for aggregation sites of seasonally dispersed hunter-gatherer groups (Hofman 1983, 1984b:172-173). It was also suggested (Sections IV and V), that the importance of final burial in the aggregate group's "cemetery" depended upon the individual's interactions with, or importance to, the aggregate group as a whole (Binford 1971). Less effort might be expended to insure aggregation site burial, as secondary or primary interments, for individuals who were important primarily at the family level (such as infants and senile adults or others of limited productivity or social recognition), than for persons who held significant relationships with numerous members of the larger social aggregate.

Given these considerations, we can begin to evaluate general implications of organizational variability in hunter-gatherer groups in the Middle South. The above arguments suggest that secondary burials will, in general, tend to be under-represented due to problems of recognition and reporting (Section VI), and that active adults of importance to the aggregate should be well represented (as both secondary and primary burials) in the cemeteries of aggregation sites. It is plausible to make some predictions about the mortality distributions of burial samples from sites representing different kinds of group organization and mobility. It is expected that individuals who died as active adults of reproductive age and were economically productive should be well represented at aggregation sites. Archaic shell middens are used here as likely candidates for

aggregation sites, for reasons discussed elsewhere (Hofman 1984b). On the other hand, something more akin to family burial plots would be expected at sites which represent seasonal habitations for dispersed families or fissioned subsistence groups. These "familial" burial sites should contain a high proportion of remains from young and old individuals who did not hold significant relationships beyond the family level.

Rockshelter sites have been chosen as possible examples of dispersed family habitation camps, some of which were recurrently occupied enough times to occasionally result in burial of individuals. Rockshelters provide likely candidates for sites which might have been used as seasonal complements to shell middens. There are several reasons for this. In the riverine areas of the Middle South, wintertime occupation of low terrace environments is precarious due to fluctuating and often high water levels (e.g., Brakenridge 1982, 1984; Webb 1974:115; Webb and DeJarnette 1942:235-239). Also, many important aquatic resources are not easily accessible when the rivers are high or in flood. Therefore, year-round occupation of these sites was often impractical.

An immediate need, at least during parts of the winter, was for sheltered living areas. Rockshelters often provide such protection in relatively high, flood-free locations. Because rockshelters and caves provide only a restricted amount of sheltered space, they were often inappropriate for large aggregate groups. Information which supports the interpretation of some rockshelter and cave sites as winter occupations during at least part of their use is

found in the faunal record. An extremely high incidence of squirrel remains is documented for Modoc Rockshelter (Parmalee 1959), Stanfield-Worley Bluffshelter (Parmalee 1962), Russell Cave (Weigel, Holman, and Paloumpis 1974), and Rodgers Shelter (Parmalee, McMillan, and King 1976). It has been argued that squirrel species are most susceptible to predation during winter when leaves are down and nests are easily monitored (Smith 1975:110-116; Hofman 1984b:160). Their common presence in archaeological refuse at natural shelter sites supports the argument for winter occupation of these sites, though not exclusive of other seasons.

Given these notions, it is expected that rockshelter habitation sites should produce a significantly higher proportion of burials representing infants, incapacitated adults, and senile individuals, than shell midden sites. Furthermore, sites of winter habitation were used during the period of the year probably having the greatest potential for physical stress, and can be expected to correlate with an above-average number of deaths among fragile or infirm individuals. The problem, once again, becomes the limited number of rockshelter sites with Archaic burial samples which have adequate sex and age information to evaluate this predicted pattern. Buikstra (1981) has discussed the mortality distribution of the Modoc Rockshelter burial sample in relation to other Archaic sites in the southwestern Illinois area and found patterning similar to what is predicted here. Buikstra has interpreted the patterning, however, primarily from the perspective of status differentiation (the G+A+S model). In the Middle South, shelter sites with burial samples

having age and sex information are limited in number. Russell Cave and Stanfield-Worley Bluffshelter are the primary sites with adequate data on several burials (Sensenig and Hoar 1962; Snow and Reed 1974). Reliable information on the mortality distribution for Archaic shell midden sites is available for several sites, notably Indian Knoll (Johnston and Snow 1961) which has a large sample, and the Robinson site (Morse 1967) which is a good (not necessarily to imply typical) example of the small Archaic shell middens in the region. Blakely's (1971) restudy of the Indian Knoll sample age and sex assessments, did not result in significant changes in the overall distribution, and is not used here because his data are presented in 10 year increments rather than five.

The mortality distribution for Archaic shell midden sites in the Middle South may be exemplified by Indian Knoll which has the largest and one of the better documented samples. Figure 7.12 illustrates the age-at-death distribution by sex for Indian Knoll (Johnston and Snow 1961:Table 2). The distribution is bi-modal with a peak at the less than one year group and a second peak at the 25 to 34 year range. The special treatment of children at Indian Knoll has been given repeated discussion (Winters 1968; Rothschild 1979), and is generally taken to indicate that there was some degree of inherited status among the Indian Knoll people. There can be little doubt that children were considered important enough to merit burial in the same manner and in the same area as adults. Two factors may have contributed significantly to the high representation of infants to the burial population. First, even if death of an infant occurred

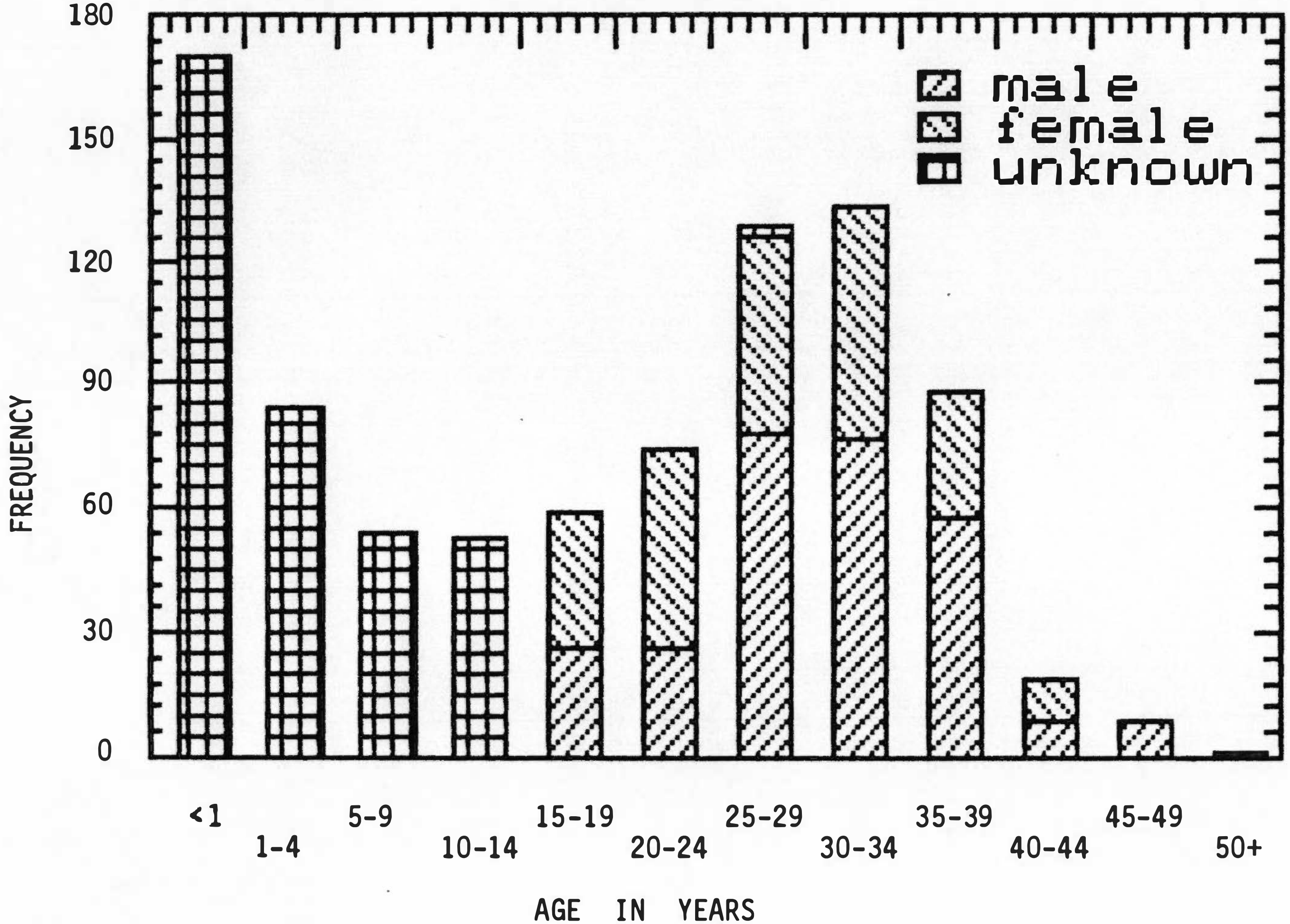



Figure 7.12. Mortality distribution of burials from Indian Knoll, Kentucky (data based on Johnston and Snow 1961:Table 2).

some distance from the site, their remains would have been easily transportable and a carrying cradle or sling may already have been made for the child's transport. Furthermore, bundled infants would rarely be discernible from primary infant burials. The second factor is that children may have held special importance to the group in times of demographic stress, and their social importance may have varied relatively independently of the manner in which the status of adults was attained (Brown 1981:29).

The high proportion of economically and reproductively active adults at Indian Knoll between the ages of 15 and 39 is well in line with the expectations for a preferred burial site. Old individuals are poorly represented at Indian Knoll, and assuming that most people did not suddenly die at age 39, suggests that older individuals of this population may commonly have been buried elsewhere.

For the Robinson site on the Cumberland River in north central Tennessee (Morse 1967), the mortality pattern is generally comparable to that from Indian Knoll (Figure 7.13). Again the high representation of infants and small children is evident and a second peak in the distribution occurs in the 20 to 39 age group (Figure 7.14).

Older individuals are slightly better represented than at Indian Knoll. A two-tailed Kolmogorov-Smirnov test shows the Indian Knoll and Robinson site mortality distributions to have no statistically significant difference at the .05 alpha level (D=.122 for the 30-34 age group, with the critical value for rejecting the null hypothesis at the .05 level being .189).

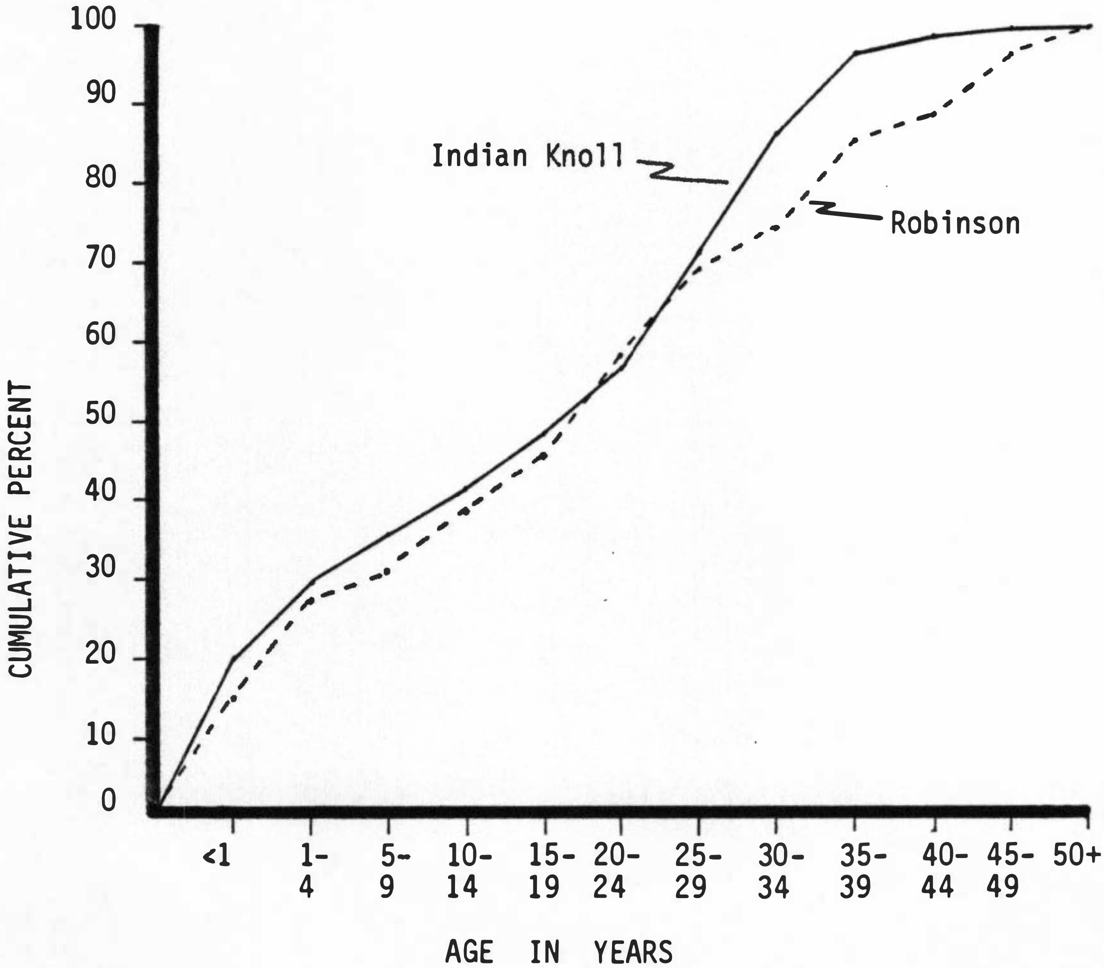



Figure 7.13. Cumulative graph comparison of the mortality distributions for the Indian Knoll site, Kentucky and the Robinson site, 40SM4, Tennessee (Robinson site data are from Morse 1967:Table 20). A Kolmogorov-Smirnov test indicates no significant difference between the two distributions.

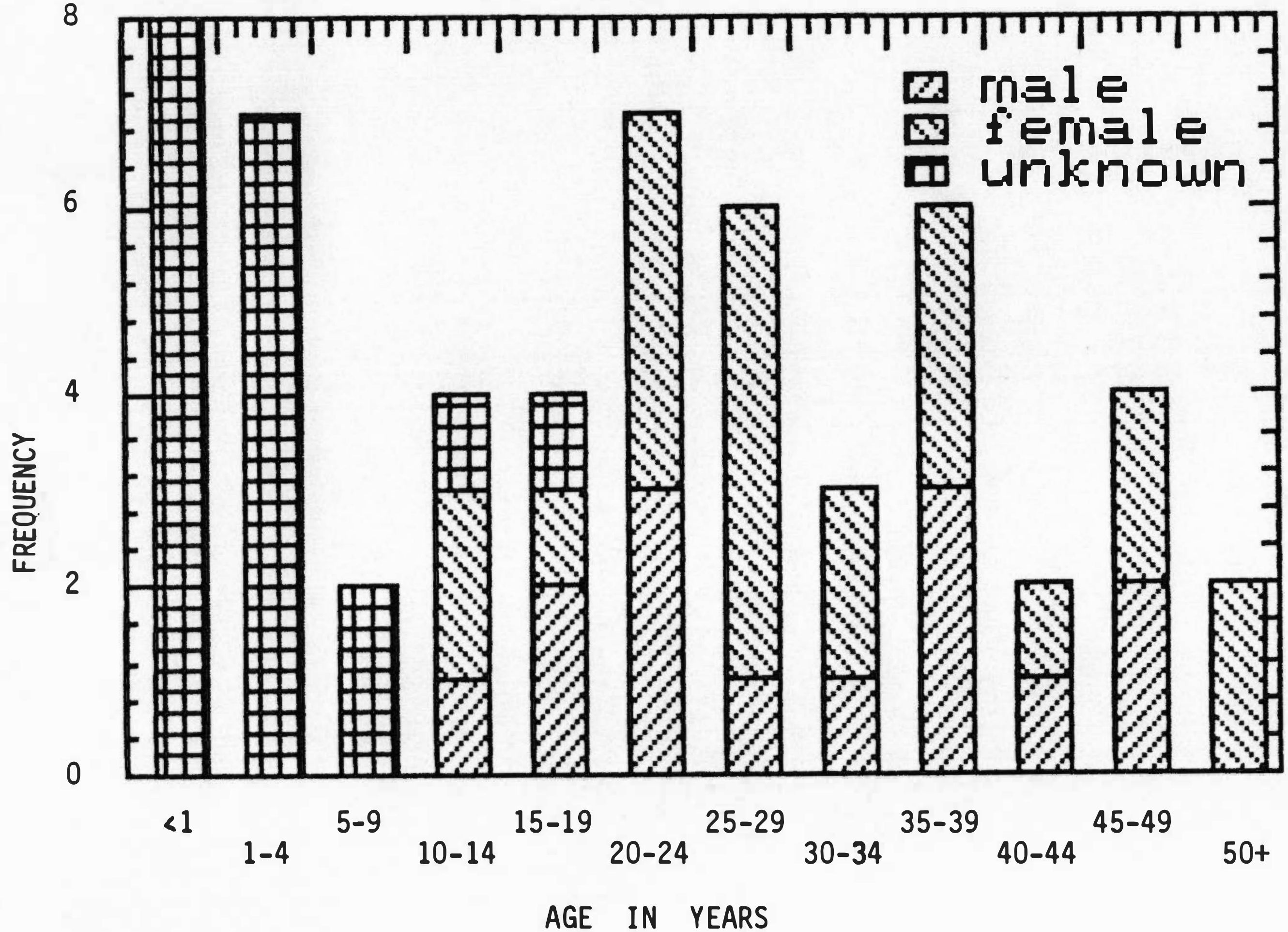



Figure 7.14. Mortality distribution of burials from the Robinson site, Tennessee (data based on Morse 1967).

For the Middle South rockshelter sites, only Russell Cave has a burial sample of greater than five individuals with age and sex information for five year intervals (Snow and Reed 1974). From Russell Cave the six individuals have a distribution quite complementary to that from Indian Knoll and Robinson. Four of the Russell Cave burials are sub-adults, one is in the 35-39 age bracket and one was 45-49 years old at the time of death. There are no individuals in the 15 to 34 year group, so strongly represented at the shell midden sites. In Figure 7.15, I have illustrated both the Modoc Rockshelter and Russell Cave mortality distributions. The predominance of old individuals is easily seen and the comparatively low representation of adults of active reproductive age is also evident, as contrasted to the shell midden site samples.

For the Stanfield-Worley shelter, age determinations are only available for general categories: infant, child, adolescent, adult, and senile. The age distribution based on these categories is shown in Figure 7.16. Subadults and very old individuals are again very well represented. The peak of this distribution is with the 15 to 45 year old adult group, but when we consider these individuals are spread over 30 years and six different age groups, then this distribution is well in line with that from Russell Cave and Modoc (Figure 7.15). By grouping the individuals from all sites into three general age categories, subadult (0-14 years), active adult (15-39 years), and old adult (40-50+ years) we can test the significance of the mortality distributions between the shell midden and rockshelter sites. A crosstabulation between the shelter sites and Indian Knoll

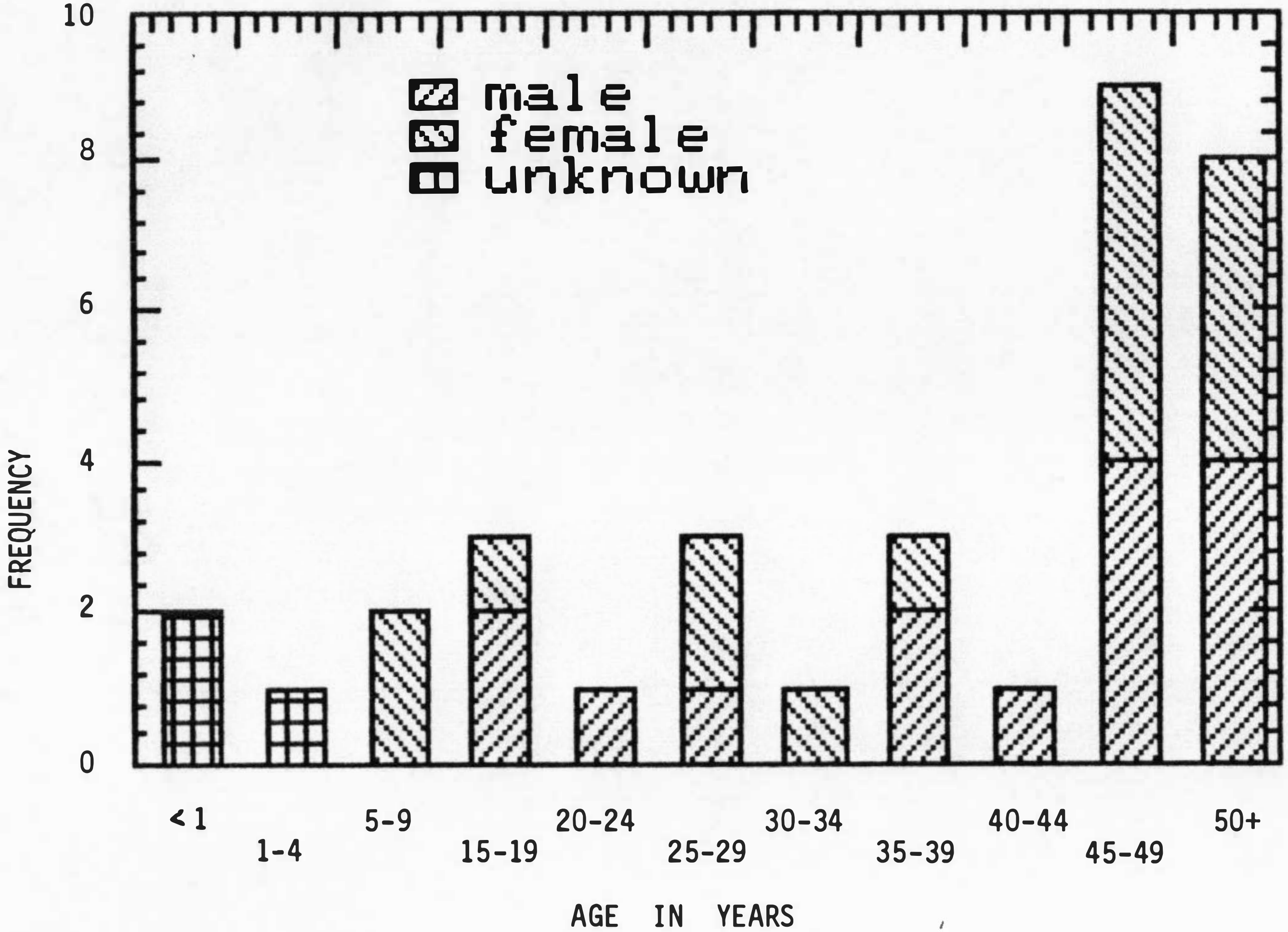



Figure 7.15. Mortality distributions of Archaic burials from Modoc Rockshelter, Illinois (data from Neumann 1967), and Russell Cave, Alabama (data from Snow and Reed 1974).

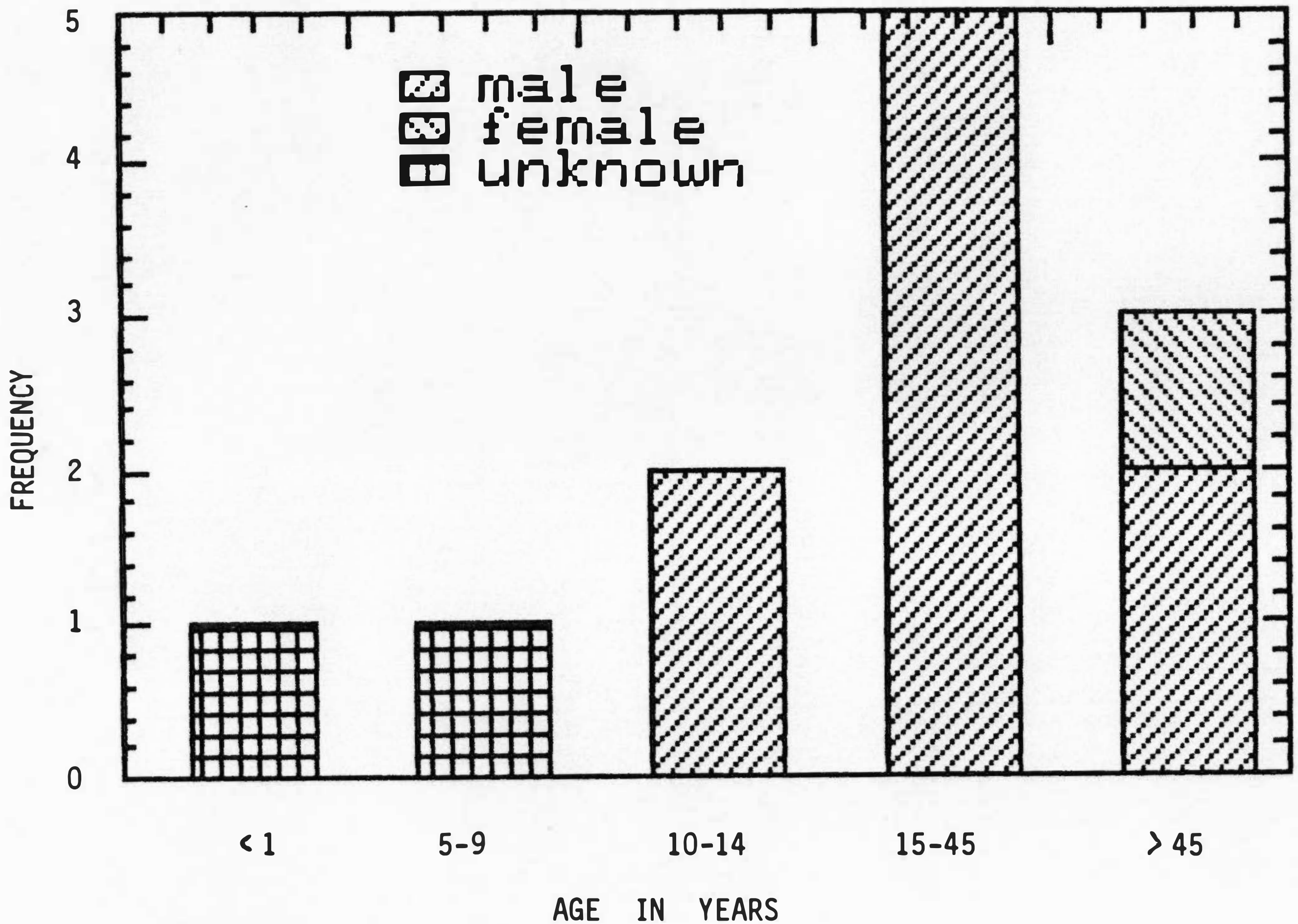



Figure 7.16. Mortality distribution of Archaic burials from Stanfield-Worley bluff shelter, Alabama (data from Sensenig and Hoar 1962).

provides a chi-square test indicating that the mortality distributions for these two site types are significantly different (Table 7.9). The large discrepancy in sample sizes, however, results in an expected value of less than five for cell A and renders the analysis suspect. Using the Robinson site in the test because of its more compatible sample size, and removing Indian Knoll, the significantly different mortality distribution for the shelters as compared to a small midden site is documented (Table 7.10). Based on this test we can reject the null hypothesis (at the .01 level) that there is no significant difference between the sample distributions.

One objectional aspect of this analysis is the inclusion (due simply to limited alternatives) of the Modoc burial series which is located more than 400 km from the other shelter sites and in the area of a different cultural tradition. Although similar functional roles for the shelters can reasonably be postulated for the two areas, I was interested in evaluating the proposed difference in mortality distributions using just sites in the Middle South. On removing the Modoc sample, however, the analysis is hampered by small sample size (there are only 18 burials from Russell Cave and Stanfield-Worley combined), and the presence of a low expected value (2.96) in one cell of the cross-tabulation. Therefore, a chi-square statistic would not be reliable.

A final comparison was done on the differences in the cumulative frequencies of age at death groups for the Robinson midden as contrasted with Modoc and Russell Cave (Stanfield-Worley burials could not be included due to lack of more specific data on age at

Table 7.9. Crosstabulation of mortality distribution by site type.

| Age Group in Years | Shelter Sites* | Shell-Midden (Indian Knoll) | Totals |
|---|---|---|---|
| 40-80 | o=21<br>e=2.5<br>$X^2$=136.9 | o=29<br>e=47.49<br>$X^2$=7.199 | 50 |
| 15-39 | o=16<br>e=24.95<br>$X^2$=3.21 | o=482<br>e=473.04<br>$X^2$=0.17 | 498 |
| 0-14 | o=9<br>e=18.54<br>$X^2$=4.91 | o=361<br>e=351.46<br>$X^2$=.259 | 370 |
| Totals | 46 | 872 | 918 |
| df=2 | $X^2$=152.6 | $p < .001$ | |

* Shelter sites included in this analysis are Modoc Rockshelter, Stanfield-Worley Bluffshelter, and Russell Cave.

Table 7.10. Crosstabulation of mortality distribution by site type, using the Robinson site.

| Age Group in Years | Shelter Sites* | Shell Midden (Robinson) | Totals |
|---|---|---|---|
| 40-80 | o=21<br>e=13.2<br>$X^2$=4.61 | o=8<br>e=15.79<br>$X^2$=3.84 | 29 |
| 15-39 | o=16<br>e=19.13<br>$X^2$=0.51 | o=26<br>e=22.87<br>$X^2$=0.43 | 42 |
| 0-14 | o=9<br>e=13.66<br>$X^2$=1.59 | o=21<br>e=16.34<br>$X^2$=1.33 | 30 |
| Totals | 46 | 55 | 101 |
| df=2 | $X^2$=12.31 | $p < .01$ | |

* Shelter sites included in this analysis are Modoc Rockshelter, Stanfield-Worley Bluffshelter, and Russell Cave.

death). Figure 7.17 illustrates the distribution by age group of burials from these two site types. A Kolmogorov-Smirnov test showed the distributions to be significantly different at the .01 alpha level (D for the 40-44 year age group is .391, with a critical D of .355). Therefore, the null hypothesis that there is no significant difference in these distributions is rejected.

Summarizing these findings, it is evident that the mortality distributions for these Archaic shell midden sites in the Middle South, Indian Knoll and Robinson, are significantly different from the mortality distributions for Archaic natural shelter sites, as represented here by Modoc, Russell Cave, and Stanfield-Worley Bluffshelter. The general pattern for shelter site burials is for a predominance of very young and relatively old individuals, with a notable and significantly small representation of persons in the 20 to 39 year old group. For convenience in further discussion, we can refer to this as the <u>family group burial pattern</u>. This contrasts markedly with the situation at the shell middens where the 20 to 39 year age group predominates, but with a high proportion of infants and young children as well. I will refer to this as the <u>aggregate group burial pattern</u>. This pattern fits will with expectations about the nature of burial patterning at aggregation sites versus camps of dispersed family groups, and is supportive of the aggregation-dispersal model of regional Archaic settlement (Hofman 1984b). It is also consistent with the proposal that these shell middens may often have been used as aggregation sites, and that individuals who were active in reproductive and economic affairs of the aggregate social

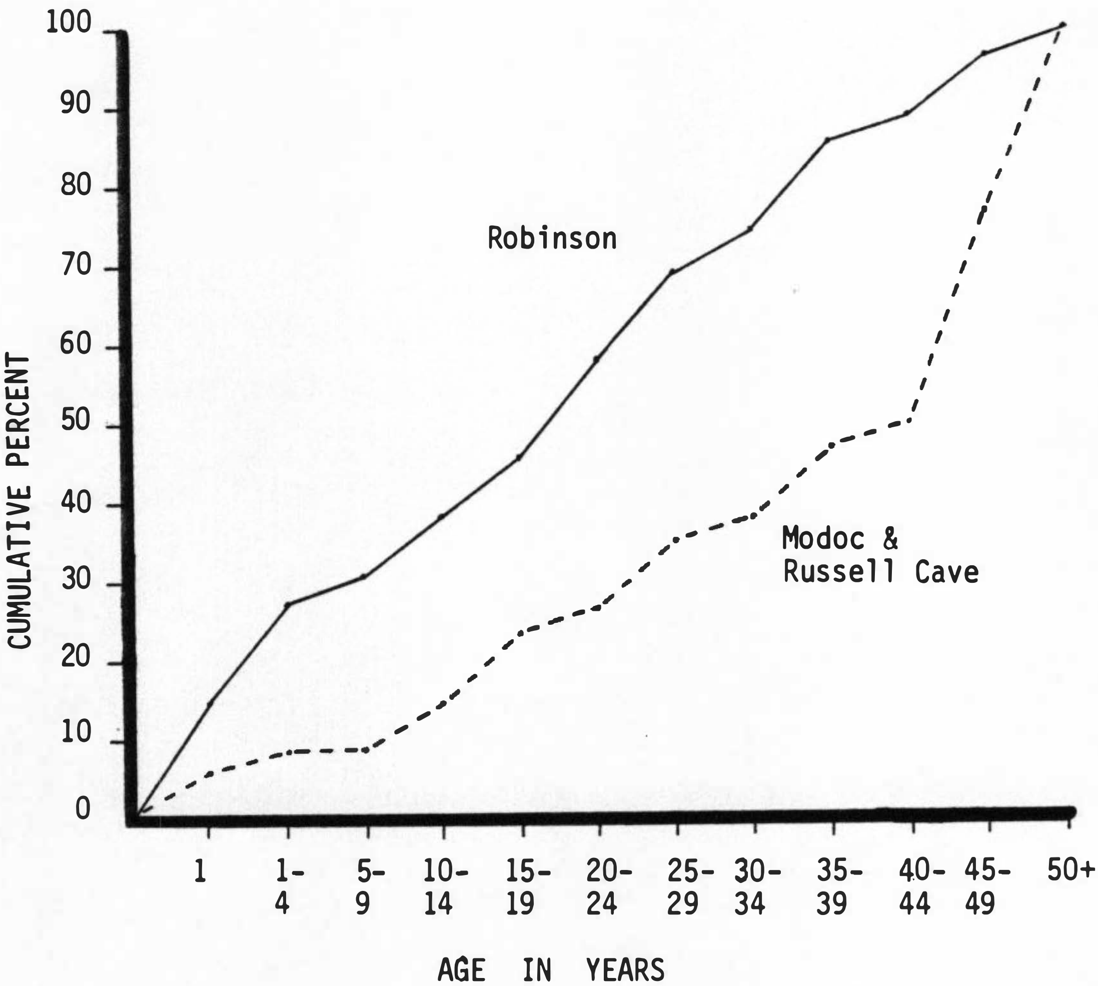



Figure 7.17. Cumulative graph comparison of Archaic burial mortality distributions from natural shelter sites (Modoc Rockshelter and Russell Cave) and a small shell midden (Robinson site, Tennessee). A Kolmogorov-Smirnov test indicates that the distributions are significantly different at the .01 confidence level.

group were buried, whenever possible, at places of (and during) aggregate gatherings.

A significant portion of the difference between the mortality distributions of these shell midden and shelter sites results from the relatively high frequency of infants represented at the shell middens (Table 7.10). This pattern could be interpreted as counter to the expectations of the aggregation-dispersal and G+A+S+R+O+C models, especially if the potential influence of seasonality on human birth frequencies is disregarded. It is well documented, however, that significant seasonal patterning in the frequency of births occurs among economically diverse groups with variable mobility (e.g., Becker 1981; Binford and Chasko 1976; Dyson and Cook 1979; Little and Leslie 1985; Scaglion and Condon 1979; Stoeckel and Chowdhury 1972). On a global scale, seasonal peaks in birth rates are well documented even among urban populations, but the degree of seasonal fluctuation in births apparently correlates with economy and settlement, and is greatest for non-urban populations (Cowgill 1966a, 1966b, 1966c). Seasonal peaks in birth frequency are essentially reversed for the northern and southern hemispheres, and conception appears to correlate with temperature as well as nutrition and mobility (Binford and Chasko 1976; Cowgill 1966a, 1966b).

Given a correlation between peak birth periods and frequency of fetal deaths, we can expect that the occurrence of fetal/infant deaths (and burials) will pattern seasonally among hunter-gatherer groups. This could plausibly result in an over-representation of newborn burials at sites occupied during the season of highest birth

frequency. For hunter-gatherers in the Middle South, this period may well have been between late spring and early fall, or the period of least inclement weather and when aggregation site occupation was most likely. Though we have no basis at present for establishing the season of highest birth rate for Holocene hunter-gatherers in the Middle South, this factor may figure importantly in the overall patterning of mortality curves among hunter-gatherers.

Mention should also be made of the fairly consistent and relatively high frequency of secondary burials in the rockshelter sites mentioned above. Two factors emerge here. First, in situations where repeated occupation occurs in a confined space, it is expected that aboriginal digging activities would commonly have encountered and disturbed materials previously buried in the deposits. Burials which were originally primary, might appear in the archaeological record to be secondary due to aboriginal disturbance and repositioning of the bones. Also quite likely is the possibility that individuals of importance at the family level as opposed to the aggregate level would be buried, when feasible, in one of perhaps several preferred family grave sites. If during some periods Archaic people spent a significant amount of the year in a residentially mobile foraging pattern, then they may have been in the vicinity of a preferred family burial site only occasionally. Such a pattern could result in the need for secondary burial, due to problems of time and location of death, at both aggregation sites and family habitation sites. Again, it is expected that the frequency of secondary burial

would decrease as territory size decreased and logistical mobility increased.

## Hints of Diachronic Change: Sites on the Duck River, the Eva Site, and the Georgia Coast

Based on predictions generated from the G+A+S+R+O+C model as discussed in Section V and the final portion of Section VI, some temporal changes in the frequency of secondary burial are expected for the Middle South as a whole (Figure 6.24, page 121). For the most part, due to problems discussed above pertaining to differences in recovery, reporting, small sample sizes and poor dating of burial samples, it is not feasible to evaluate these diachronic changes on a regional basis.

As a preliminary venture into this problem, however, data sets from three localities are considered because they contain sequential burial samples, and settlement models have been proposed for group mobility and organization. One prediction to be checked is that among hunter-gatherers the frequency of secondary burial will generally decrease on a regional scale in conjunction with population increase, decreasing territory size, and increasing sedentism (or as the number, duration, and distance of movements decrease). A second consideration concerns temporal change in the occurrence of the aggregate group versus family group burial patterns as potential indicators of changing land use patterns at a sub-regional level.

Obviously, these factors may not correlate directly with chronology, so that variation from the predicted pattern of occurrence for secondary burials could result from vagaries with the assumptions rather than from an error in the model itself. For example, even though it is expected that territory size generally decreased through time as population increased on a regional scale, we know that population did not increase steadily in all areas or localities during all periods. Therefore, incongruence with the model might result from irregularities in population change and irregular rates of change in economic territory size. So, because the model is designed based on assumptions made at a regional level, its use in specific areas requires use of assumptions that need to be re-evaluated for each specific application. For present purposes, it is assumed that these assumptions pertaining to population, mobility, and economic territory size are appropriate for these specific applications.

For the central Duck River Basin of middle Tennessee, there are several dated Archaic burial samples which have been recovered using fairly standard fine screen recovery techniques and for which basic interment information is available. These three sites on the Duck River in Maury and Hickman counties in the western part of the Nashville Basin are Ervin (discussed above), Fattybread (Amick 1985), and Oldroy (Herbert 1985). The ages of these burial samples are approximately 6,000 radiocarbon years ago for Ervin, circa 4,200 years ago for Fattybread, and circa 3,000 years ago for Oldroy. In Figure 7.18 the frequencies of secondary burials for these sites are

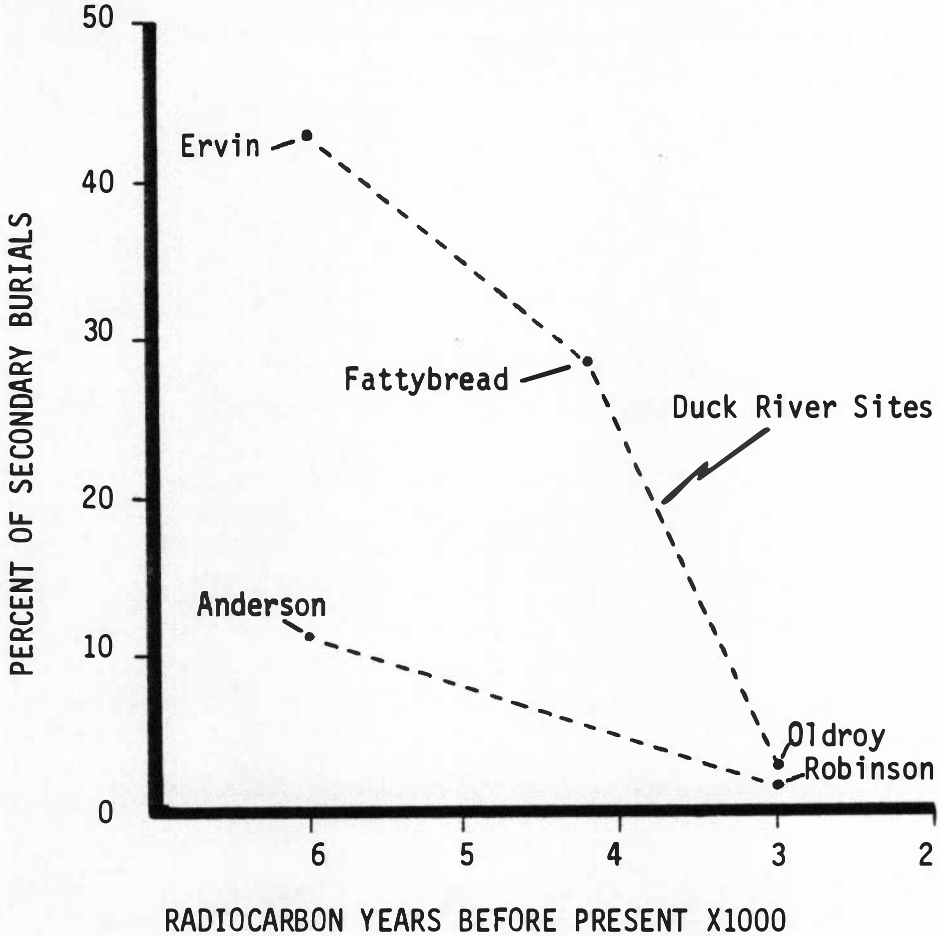



Figure 7.18. Plot showing the relative frequency of secondary burial through time for well dated Archaic samples from along the Duck River and other Nashville Basin Tennessee sites.

plotted against their chronological ages. Also, secondary burial frequencies for the Anderson and Robinson sites are plotted in Figure 7.18 for comparison. Anderson is located on the Harpeth River and also in the western part of the Nashville Basin, but recovery was based on use of one-half inch mesh screen and cremation burials may be under-represented. Anderson burials date to primarily between 7,000 and 5,000 years ago. The Robinson site, dating to between 2,800 and 3,000 years ago, is located on the Cumberland River in the northeastern part of the Nashville Basin.

For the Duck River Archaic sites a general and fairly dramatic decrease through time is evident in the frequency of secondary burials. The proportion of secondary burials at Fattybread may be significantly over-estimated, because there are nine burials of indeterminate form documented at the site, and most of these were probably primary inhumations. Despite the limited size of these samples, the decreased frequency of secondary burial which is indicated conforms well to expectations about burial variability if population was increasing in the area and mobility was becoming more logistically organized around sites of increasing residential permanence (Amick 1984; Hofman 1984b).

Magennis's (1977) detailed demographic study of burials from components at the Eva and Cherry sites provides an opportunity to evaluate diachronic variation in the mortality distributions of Archaic groups from a single locality. Both sites are located in the western Tennessee Valley about 70 to 120 km west of the Duck River sites just discussed. The Eva site is located in a bottomland

situation between Cypress Creek and the Tennessee River, while the Cherry site, located about 10 km from Eva, is situated in a more elevated position on the Big Sandy River, a tributary to the Tennessee. Building on the synchronic discussion in the previous section, information from these Middle and Late Archaic components enables the investigation of the "family group" and "aggregate group" burial patterns, as reflected by mortality distributions, in a temporally ordered and spatially restricted context.

Three skeletal groups are segregated by Magennis from the Eva burial sample, with the Cherry site sample being assignable to the same temporal-cultural complex as the latest Eva component, the Ledbetter Phase (dating to circa 3,200 to 4,500 B. P.). The earliest Eva burial sample comes from Strata IV and V and represents the Eva horizon, dating between about 7,300 to 6,500 years B. P. (Hofman 1985c: Table 8.1). An intermediate (Stratum II) component at Eva is assignable to the late Middle Archaic, is characterized by Benton and Sykes projectile points, and is here suggested to date between 6,200 and 4,800 B. P. Although dating of these Eva site components is relative, the burial features are fairly well documented as to stratum of origin. The general sequence is considered reliable, though specific temporal-cultural assignments may vary somewhat between archaeologists.

In considering the mortality distributions for these western Tennessee Valley samples, it is readily apparent that significant differences occur. This significance is supported by statistical tests as noted below. Discussion of these samples will begin with the earliest component and proceed chronologically.

The burial sample from the Eva horizon component at the Eva site is small (Figure 7.19), but the mortality distribution includes a strong representation of individuals of active adult age (15-39 years). The distribution conforms well with that from the Robinson site and a Kolmogorov-Smirnov test indicates no statistically significant difference in the distribution of these two samples. (A two tailed test at the .05 alpha level had a critical value of .284. The maximum difference between the samples was D=.131 for the 10-14 year age group, so the null hypothesis of no significant difference between the samples was accepted). This pattern is of the type discussed above as an aggregate group burial assemblage, and is the kind of distribution we might expect based on the Indian Knoll and Robinson site samples, given the interpretation of these shell midden components as possible aggregation sites.

The mortality distribution for the Sykes-Benton period burials at Eva (Magennis's component II) is in most respects comparable to that from the Robinson site and the earlier Eva component at the Eva site, but there is an especially strong representation of older adults in the 30 year and above age groups (Figure 7.20). In this respect, the Sykes-Benton sample from Eva appears somewhat intermediate between the aggregate burial pattern and the family

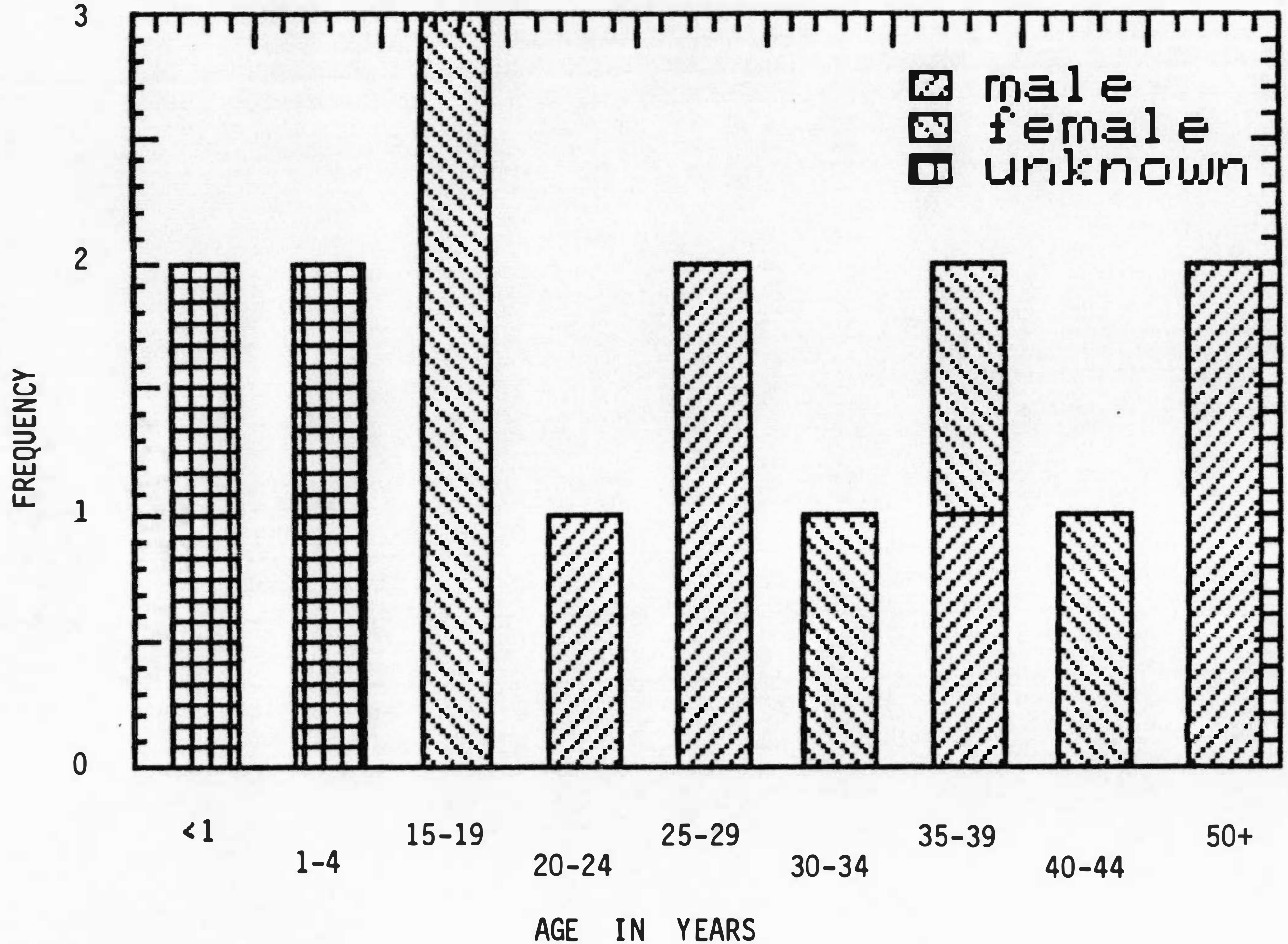



Figure 7.19. Mortality distribution of burials from the Eva site component I, Eva horizon (Strata IV and V). Data derived from Magennis (1977).

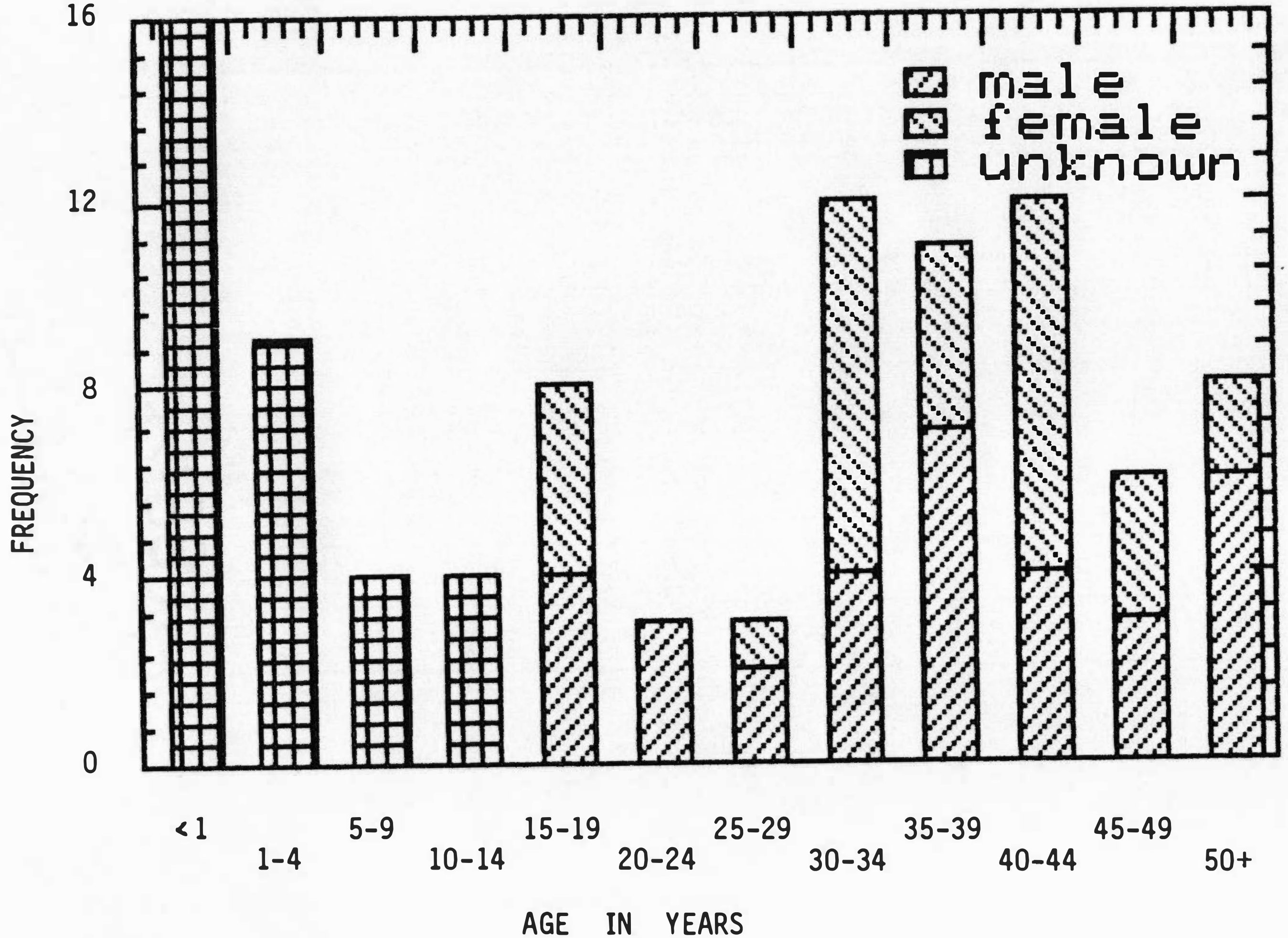



Figure 7.20. Mortality distribution of burials from the Eva site component II, Sykes-White Springs and Benton period (Stratum II). Data derived from Magennis (1977).

group pattern, and between the earlier and later samples from the Eva site.

For the Ledbetter Phase occupation at Eva, a marked change in the mortality distribution is evident with a strong representation of young and old persons and poor representation of the 15 to 35 year old "active adult" groups (Figure 7.21). This is the family group burial pattern which was recognized above in the context of rockshelter sites, and interpreted as reflecting winter occupancy by dispersed family units. Indeed, a Kolmogorov-Smirnov test shows the Ledbetter phase sample is significantly different, at the .05 level of probability, from both the Late Archaic Robinson site and from the earlier Eva site components. Furthermore, a similar test indicates the age distribution of Eva site Ledbetter phase burials is <u>not</u> significantly different from the rockshelter sites (as represented by Modoc and Russell Cave). Figure 7.22 illustrates the similarity of the mortality distribution from these sites. (Testing between the Eva site Ledbetter sample and the rockshelter sites produced a maximum D of .177 for the 40-44 year age group. A critical value of .317 would have been required at the .05 level in order to reject the null hypothesis that the samples exhibit the same distribution).

In comparing the Ledbetter component burial data from Eva to the contemporary and nearby Cherry site sample, we again see a significant difference. The Cherry site mortality distribution, with a predominance of active adult age 15 to 39 year old individuals represented (Figure 7.23), conforms well to that seen at the contemporary Robinson site and at the Eva site during the Eva

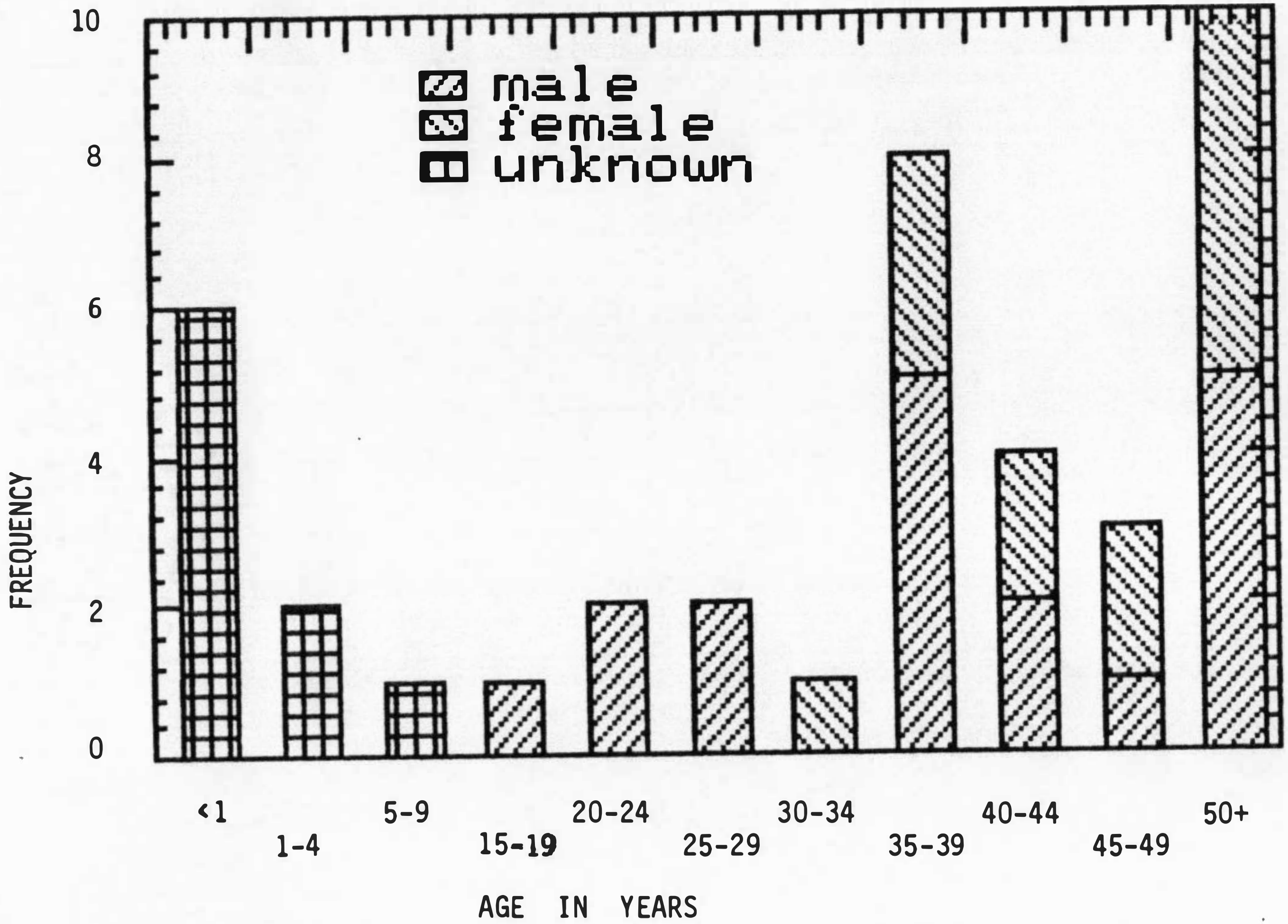



Figure 7.21. Mortality distribution of burials from the Eva site component III, Ledbetter phase (Stratum I and upper Stratum II). Data derived from Magennis (1977).

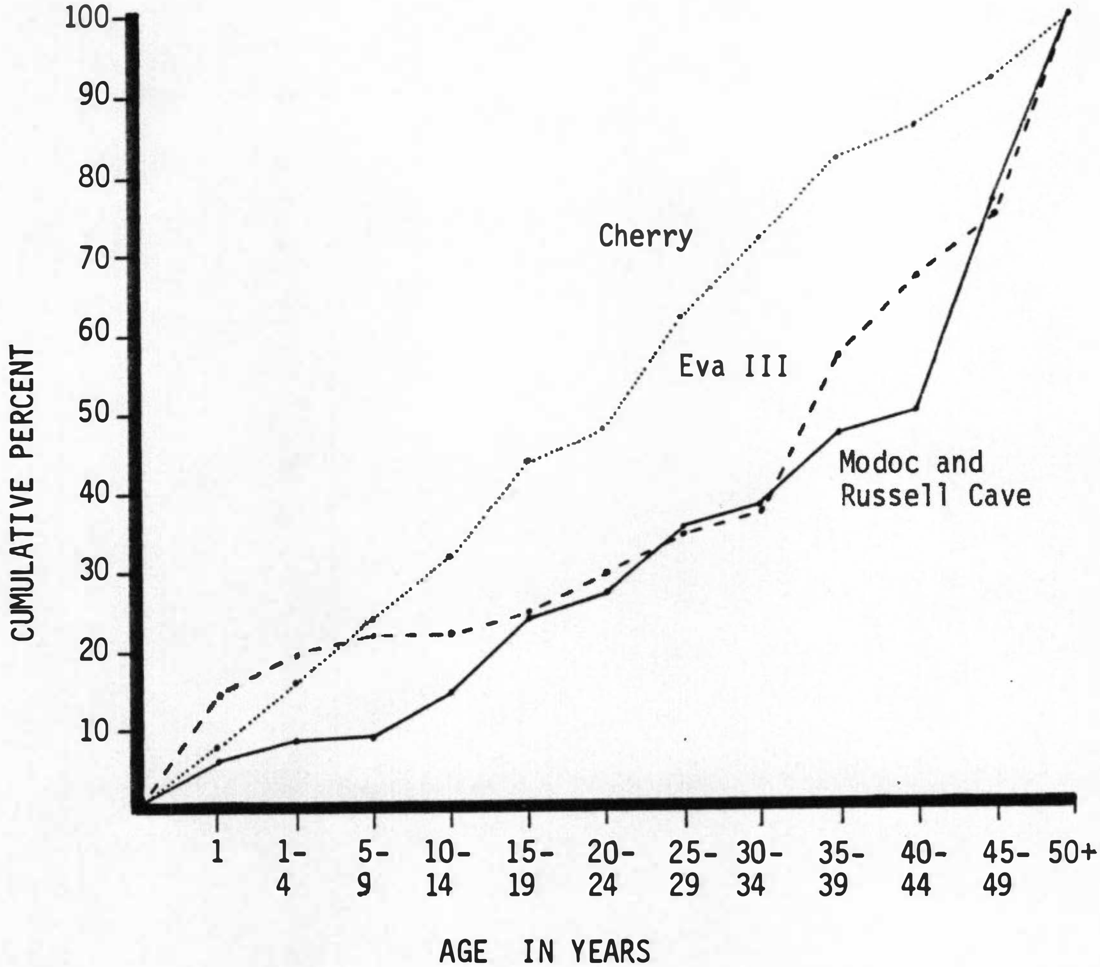



Figure 7.22. Cumulative graph comparison of mortality distributions for Archaic shelter sites (Modoc Rockshelter and Russell Cave), Eva site component III (Ledbetter phase), and the Cherry site (Ledbetter phase). A Kolmogorov-Smirnov test indicates that the Ledbetter phase mortality distributions of the Eva site component III and Cherry site are significantly different at the .05 level of confidence.

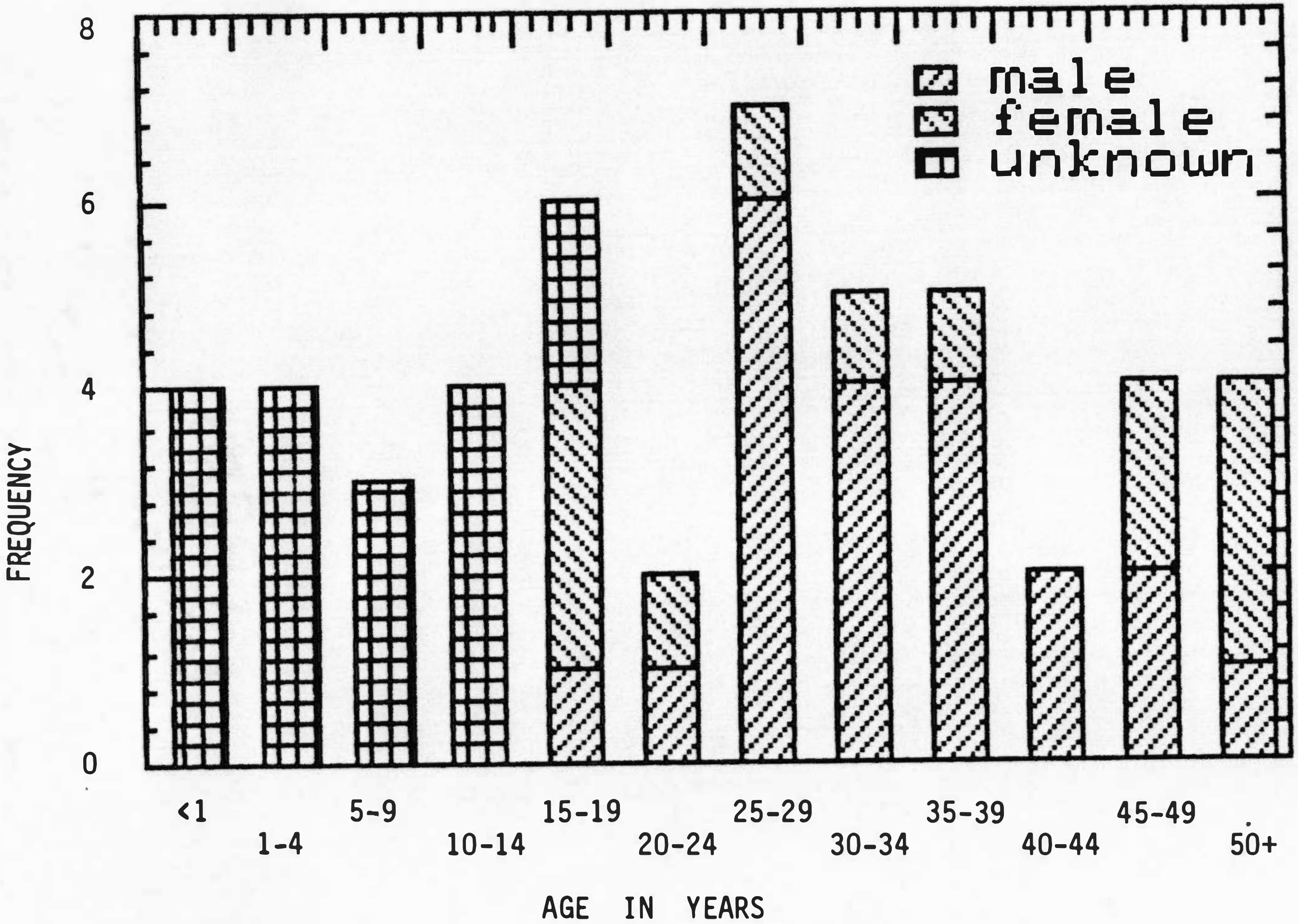



Figure 7.23. Mortality distribution of Ledbetter phase burials from the Cherry site. Data are from Magennis (1977).

horizon. The significant differences in mortality distributions between the Ledbetter components at Cherry and Eva are illustrated in Figure 7.22. A Kolmogorov-Smirnov test between these two samples produced a D value of .345 (for the 30-34 year age group) which requires rejection at the .05 level (critical value of .2885) of the null hypothesis that there is no significant difference between the sample distributions.

For the four Archaic components in the western Tennessee Valley, then, we find both the family group and aggregate group pattern of mortality distribution represented. The Ledbetter component at Eva stands in contrast to the other open midden site samples which have been considered here by its blatant family group pattern. This pattern is not expected if (when) components represent repeated occupations by aggregate groups.

As it happens, there is fairly good supporting evidence to suggest that the Ledbetter component at Eva does not represent the remains of aggregations. It has been argued that the various occupations of the Eva site were not all of the same type (Hofman 1985c:132-133; Winters 1969:132-133). It has also been proposed that seasonal movements and differential site use were integral to the Ledbetter phase occupation of the western Tennessee Valley (Bowen 1977). I argue that the role of the Eva site as an occupation site in the regional Archaic settlement-subsistence system changed rather dramatically between 7,000 and 3,500 years ago. This change is evidenced by the absence of mussel shell in the Late Archaic Ledbetter (Plowzone and Stratum I) levels of the Eva site (Lewis and

Lewis 1961). It is argued elsewhere (Hofman 1984b:172-173) that shellfish may have provided a economic "pull" or key resource in determination of some aggregation site locations because of the reliability and predictability of this food source. It has been argued for the Eva site, however, that at the end of the Hypsithermal (ca. 4,000 B. P.) there were concomitant changes in site specific (stream channel) and regional environments which resulted in a significant decrease in shellfish availability in the immediate area of the Eva site (Lewis and Lewis 1961:20-23). Such a decrease also came at the end of a long period of shellfish exploitation, and possibly over-exploitation (cf. Botkin 1980) in the Eva site area. If the dramatic decrease in shellfish representation in the Eva site midden during the Late Archaic actually resulted in a local decrease in shellfish availability due to ecological factors, then the appeal of the Eva site as a location for group fusion and aggregation would have been diminished. Alternative locations for group aggregations would have been sought, and the Cherry site, located in a different portion of the drainage system may have been one such alternative. The Cherry site shell deposits are not extensive, but the availability of shellfish for dietary supplements in locales where this resource was not previously exploited may have provided adequate incentive, or ecological pull, when key resources at traditional aggregation sites became unreliable.

Based on this line of thought, it can be argued that Ledbetter phase occupation at Eva may have been primarily by dispersed family groups (though probably not during the winter), as opposed to earlier

periods when Eva was at least occasionally used as an aggregation site. Such a shift in site use may not be easily observed through artifactual evidence, due to the fact that recurrent occupations by single families or small subsistence groups could easily result in a palimpsest of artifactual remains similar to what might result from short term occupation(s) by larger aggregate groups (Binford 1982, 1983; Galm and Hofman 1984:69; Hofman 1984b:133; Todd and Hofman 1980:20). It is not surprising, therefore, that Winter's (1969:132-133, Table 74) analysis of the assemblage variability in the Eva components showed most of them to be very similar.

Given that this scenario is at least a plausible argument for explaining the observed changes in the mortality distributions for the western Tennessee Valley components, then these observations have implications for previous interpretations of such variability. The complementary distributions of mortality data for the Ledbetter components at the Cherry and Eva sites, might be viewed from Buikstra's (1981) perspective to result from the use of different cemeteries for individuals of different status positions. A similar interpretation of hunter-gatherer mortuary variability is also found in Rothschild (1983). In the case of the Cherry and Eva sites, there is no obvious reason for assuming such status differential (e.g., one site is not a mound and the other a habitation site as in the case of Buikstra's study). It is not realistic, therefore, to always interpret the kind of mortuary patterning observed by Buikstra as the result of status differentials.

The Ledbetter occupations of the western Tennessee Valley provide a likely case in which such complementary mortality distributions may result simply from different kinds of site occupancy and shifts in group organization and regional land use patterns. It is notable that Buikstra (1981) used supportive studies of stature and pathologies to enhance the "confidence" in her interpretations. We would, likewise, expect physically impairing pathologies to be most prevalent among individuals who did not hold important social and economic relationships with numerous members of the aggregate group, and, therefore, to be well represented in cemeteries having the family group mortality pattern. In this light, the enhancing and supplementary nature of the G+A+S+R+O+C model (to the G+A+S model) is evident with respect to interpretations based solely on gender, age, and status. We can potentially learn much more from these mortuary data than facts such as that significant differences occur in the age, and perhaps status, of Ledbetter phase people buried at the Cherry site as opposed to the Eva site. Information pertaining to group organization and settlement variability may also be accessible.

Artifactual correlates of aggregate group behavior may to some extent be recognizable and provide an ancillary data set for distinguishing between family camps and aggregation sites. The problem of contemporaneity of recovered artifacts becomes critical in differentiating palimpsests of repeated family group occupations from assemblages which result from aggregation. Many of the basic activities and artifact correlates which result from both kinds of

occupation may be very similar. Given that contemporaneity can be established in some cases, for example between the items contributed to a single grave, then some aggregate group deposits may leave distinctive signatures. We might expect the co-occurrence in contemporary contexts of materials from different sources (perhaps different directions from the site), and perhaps the presence of items which could be argued to hold significance beyond the individual or family level. The latter could include items which are locally irreplaceable and were acquired through long-distance trade, trading partners, or logistical excursions. In the Middle South such items may have included copper and marine shell artifacts during the Archaic period. The presence of such items at the Cherry site and component II at Eva, and their absence from component III Ledbetter occupation at Eva, is plausible from this perspective (Lewis and Kneberg 1959:Table 1). The participation of distinct social subgroups at different times in a burial program may be indicated by the inclusion of burned and unburned artifacts in secondary cremations. It is also common for artifacts from such burials to include locally irreplaceable objects. The public display of loss for individuals who importance reached beyond the family level, may commonly have included the "sacrifice" of objects with importance also which reached beyond the family to the larger aggregate group.

As another example of diachronic change in mortuary variability, which may reflect, in part, changes in mobility and settlement, consideration is given to Woodland and Late Prehistoric burial data from St. Catherines Island off the Georgia coast (Thomas

and Larson 1979; Larson and Thomas 1982). These data, obviously, are not representative of Archaic hunter-gatherers. They do, however, provide another perspective on the basic problem being addressed here, the impact of organizational differences on mortuary activity. Burial information for the Refuge-Deptford period (ca. 3,500 to 1,400 years ago), and the St. Catherines period (ca. A. D. 1000-1150; Larson 1982:164-165) is compared below. Refuge-Deptford people apparently occupied St. Catherines Island on a seasonal basis, and the influence of this pattern on mortuary practices is discussed by Thomas and Larson (1979:147) as follows.

> Why, then, are bundle burials so prevalent? We think one clue might be in the seasonality and periodicity of Refuge-Deptford settlements . . . . Camps were probably moved at least two or three times annually . . . . Milanich (1971:194) has suggested that the people of the Coastal Tradition (Deptford and pre-Deptford) employed a transhumant settlement pattern, moving inland during the fall to harvest nuts and berries and presumably spending much of the rest of the time exploiting marsh and maritime resources . . . . This hypothesized seasonal round has relevance to the mortuary patterns noted on St. Catherines Island for Refuge-Deptford times. We think it possible that individuals who died during the mainland portion of the seasonal round were saved for ultimate burial in the mounds of St. Catherines Island. Such a pattern would explain not only the frequency of bundle burials at these sites, but also the strange mixture of burials noted in the central tomb at McLeod. . . . the tomb contained the remains of five females. Two seem to have died almost immediately prior to burial, but the others had obviously died weeks, or months, previously. We are suggesting the possibility that the individuals buried as bundles perhaps died on the mainland, and were then transported for burial on St. Catherines . . . .

Thomas and Larson provide no reason for why these groups would want to transport the remains of those who died on the mainland back to St. Catherines, but the idea fits very well with the model being

proposed in this study, provided that we add a couple of key elements. First, if the fall occupation of the mainland was directed importantly toward nut mast harvesting, then the mainland sites would not have been spatially fixed or totally predictable year after year due to variation in mast productivity (Hofman 1984b:168-170). This period might also have been one of group dispersal into subsistence groups and family units. Because of the more predictable nature of coastal and maritime resources in the St. Catherines Island area, however, the location and period of occupation for island sites could have been relatively fixed. Such sites of predictable occupation and resource fixity are likely candidates for aggregations of seasonally dispersed family or subsistence groups. Burial sites for the aggregate group would likely occur in the proximity of island sites occupied during periods of group fusion.

It can be predicted, assuming population increase, that there would have been increasing sedentism near key resource patches (Dyson-Hudson and Smith 1978), and increasing logistical mobility in the St. Catherines area through time. In Table 7.11, a decrease in the relative frequency of secondary burial during the St. Catherines period is evident. This decrease of about 10 percent, from 47.2 percent secondary burial to about 36.9 percent secondary burial based on number of individuals, is supportive, albeit slight, evidence of the predicted trend. In the case of the St. Catherines period burial frequencies, consideration should also be given to the possibility of staging in the burial program (Brown 1981; see also Tainter 1983:154). Individuals originally interred as extended burials in a

Table 7.11. Summary of burials of determinant form from Refuge-Deptford and St. Catherines periods, St. Catherines Island (data from Thomas and Larson 1979; Larson and Thomas 1982).

| Burial Type | Refuge-Deptford # | Refuge-Deptford % | St. Catherines # | St. Catherines % |
|---|---|---|---|---|
| Primary: | | | | |
| Extended | 18 | 50 | 37 | 57 |
| Flexed | 1 | 2.8 | 4 | 6.1 |
| Primary totals | 19 | 52.8% | 41 | 63.1% |
| Secondary: | | | | |
| Bundle | 14 | 38.9 | 21 | 32.3 |
| Cremation | 3 | 8.3 | 1 | 1.5 |
| Skull only | 0 | 0 | 2 | 3.1 |
| Secondary totals | 17 | 47.22% | 24 | 36.9% |
| Totals | 36 | | 65 | |

central mortuary feature such as Johns Mound may later have been bundled and reburied, perhaps in another part of the mound. We should not therefore assume that all bundle burials at the St. Catherines Island sites are individuals that were transported from the mainland. The opportunity and likelihood of disturbing and reburying skeletons may have been especially great if the mortuary features were used over extended periods of time.

If the St. Catherines period occupants of St. Catherines Island were more logistically organized and less residentially mobile than the Refuge-Deptford occupants, a change in the age and sex distribution of bundle burials would be expected. The actual pattern of age and sex distribution for the bundle burials is, however, somewhat different than predicted (Figure 7.24). In general, the Refuge-Deptford pattern with predominantly adults occurring as bundle burials (69 percent) is in line with expectations for logistical mobility out of relatively long-term habitation sites. The most striking factor, however, is that these adult bundle burials are almost all female (8 of 9, or 89 percent). This could reflect logistical activities by adult women (fall nut collecting?) or simply a sex-linked burial program. For the St. Catherines period bundle burials, there is a more even age group distribution with a higher representation of children (only 57 percent of the bundles were adults) and a more even breakdown of adults by sex. This pattern is especially interesting because it is essentially what would be expected for a predominantly residentially mobile group. It is also a pattern that could indicate a distinct social subgroup to which

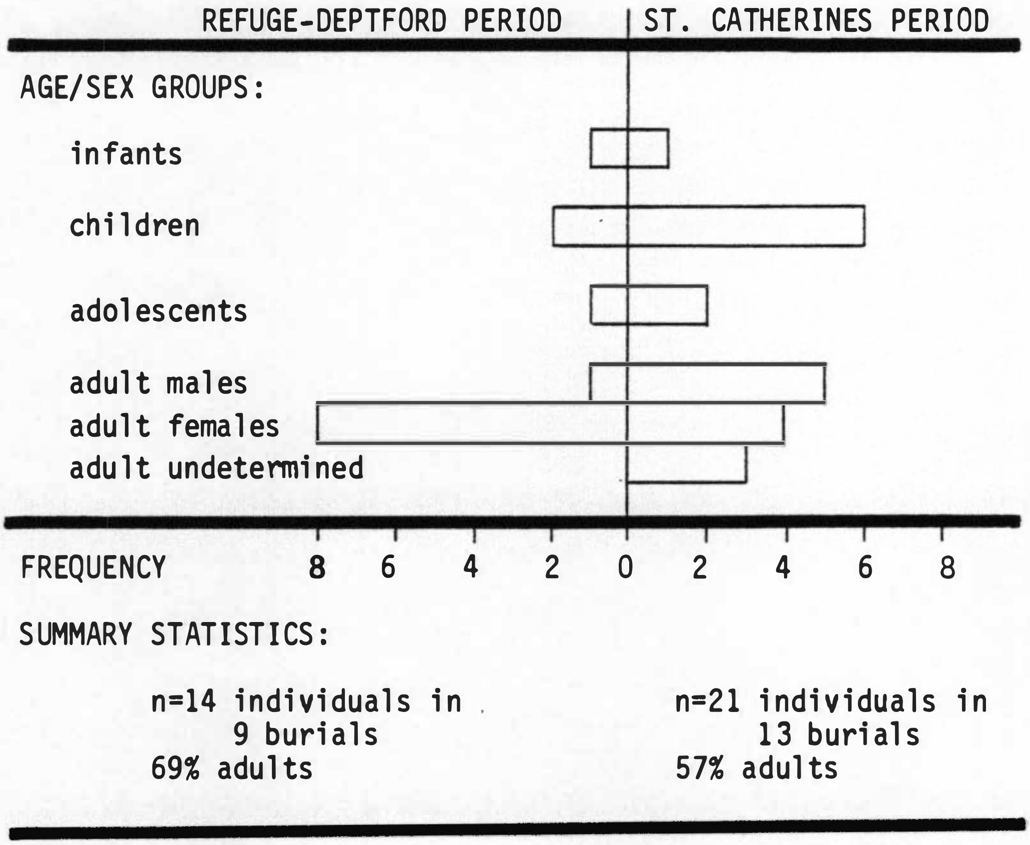



Figure 7.24. Mortality distributions for Refuge-Deptford period and St. Catherines period secondary burials from St. Catherines Island. Data are derived from Thomas and Larson (1979), and Larson and Thomas (1982).

members of all age groups were ascribed. It is not likely to represent an elite social class in this instance, because almost 40 percent of the population was disposed of by secondary bundle burial. The St. Catherines period burials (A. D. 1000-1150) are interpreted by Larson (1982; Larson and Thomas 1982) to represent non-agricultural peoples. Larson (1982:167) interprets St. Catherines period settlement and economy as follows:

> . . . prior to A. D. 1150, habitation localities on the prehistoric Georgia coast were small, widely dispersed, and given their thin depositional context, most likely represent isolated short-term occupations. Milanich (1971) suggested that the small settlement areas . . . may represent nuclear family occupation of small seasonally occupied settlements. . . . prior to A. D. 1150, human populations were widely dispersed and located in small short-term settlements, and following A. D. 1150, human populations increased, became less mobile, and inhabited villages for lengthier periods of time.

These comments suggest that a dispersed family foraging economy may have, in fact, been operating for a significant portion of each year during the St. Catherines period. Interpretation of the age and sex distribution of bundle burials from the St. Catherines period mortuary sites, as presented here, is certainly parsimonious with such a model, especially if occasional aggregations occurred. The "logistical" looking age distribution for the Refuge-Deptford period bundle burials is perhaps a factor of sample size. It is quite probable, however, that fluctuations in economic organization and mobility patterns would have occurred during the late Holocene occupations of the St. Catherines and other areas, due to ecological and social factors. Therefore, "reversals" in mobility patterns,

even of the same cultural group, might be expected to periodically occur. Also, this may have been an instance in which a decrease in territory size reduced the potentials and feasibility of logistical movements (due to conflict, competition, etc.) and a forager or residentially mobile economy was pursued in a more circumscribed territory. This would be feasible in many situations, given that the smaller territory was relatively rich in second line or backup resources (of somewhat less energetic efficiency) which could be intensively exploited, and/or stored, over long segments of the year.

## Beyond the Middle South

The Middle South has provided an initial reference point for investigating some of the ideas which have been presented here pertaining to the significance of mortuary variability among hunter-gatherer groups. Limitations in this data base have inhibited the study in some aspects, but this is not a problem restricted to the mid-continental United States. The problem is not so much the result of small sample size per se, as it is poor preservation, recovery, recognition, and reporting of mortuary information. Many of the limitations are with our archaeological approaches, rather than being inherent in the archaeological record. In other areas similar limitations are equally evident.

On a global scale, especially in coastal and riverine environments, numerous archaeological complexes representing a diversity of hunter-gatherer groups exhibit characteristics of seasonal sedentism and changing adaptations and organizations

reflecting the transition from mobile to sedentary lifeways. For some of these cultural complexes there exists substantial evidence of mortuary activities. Cross-cultural archaeological investigation of these various complexes may significantly enhance the pattern recognition study begun here. Further documentation of the chronology of mortuary change is needed in situations where the transition from "mobile" to "sedentary" is otherwise in evidence. Archaeological research on a global scale should provide an important source for evaluation and refinement of the model presented here. Evaluations through ethnoarchaeological observation of burial practices among mobile or seasonally mobile hunter-gatherers is likely to be of limited success for a number of reasons (appropriate groups to study, necessity for long term field observation, aboriginal rights, etc.). Therefore, our most expedient, though in some way limited, means of evaluating models and explanations of hunter-gatherer mortuary variation will be through use of the archaeological record. Linkages are needed between the organizational aspects of groups and their material correlates in the mortuary domain. The present lack of such linkages, developed in a controlled ethnographic context, presents a serious limitation in development of plausible explanations of hunter-gatherer mortuary variability as represented archaeologically. This immediate lack of independent controls should not, however, keep us from developing and evaluating pertinent models based principally on archaeological remains. Given sufficient chronological and cultural control over

samples, it should be possible to gain realistic appraisal of the general appropriateness or utility of such models.

Seasonally occupied midden sites in coastal Australia (Haglund 1976a, 1976b; Meehan 1982), Mesolithic middens of Europe (R. Chapman 1981:74-76; Price 1985:351), and Capsian middens of northern Africa (Smith 1982) provide archaeological avenues for investigation of hunter-gatherer mortuary practices which were changing in concert with subsistence and organizational aspects of these cultural groups.

Price (1985:Table 13.1) has tabulated burial information from three coastal Mesolithic cemeteries of the Ertebolle period (ca. 6100-6300 B.P.). From a total of 56 burials of determinable age and sex 45 (80.36 percent) represent adults, 2 are cremations, and only 9 are subadults. Based on the preceding discussion, this distribution could fit well with logistically organized collectors operating out of a long-term residential base, depending upon the age distribution of the adults. O'Shea and Zvelebil (1984) have reported in detail on the Mesolithic site of Oleneostrovski mogilnik in Karelia, USSR, which they interpret to have been occupied seasonally (during the summer) by an aggregate group which spent the winters as dispersed, mobile foragers. The mortality distribution for 116 burials having age information (a total of 170 individuals were recovered from the site; O'Shea and Zvelebil 1984:24, Table 1) compares well to that of the aggregate group burial pattern discussed above, with a notable under-representation of subadults. Secondary burials are apparently not represented at Oleneostrovski mogilnik, but O'Shea and Zvelebil

(1984:30) make these comments pertaining to changes in group organization and season of death.

> Oleneostrovski mogilnik would not have been used during the winter when people broke up into small groups for ungulate hunting and trapping away from the lake. Individuals who died during this period might have been preserved in the cold conditions and perhaps were selectively brought back for burial at the cemetery in the spring.

In North America, several regions provide archaeological samples where the ideas of concern here might profitably be re-assessed. These areas also have at least moderate ethnographic information of relevance, and include the coastal midden sites of California (Morratto 1984), interior hunter-gatherer cemeteries in California (King 1978), and village dwellers of the Great Plains. The latter groups were dependent upon horticulture, but their economies also relied to a significant degree upon logistical bison hunting. Such subsistence patterning, regardless of whether the home settlement is supported by shellfish, nuts and deer or corn horticulture, should result in distinctive mortuary behaviors.

In northeastern North America, there are a number of Archaic sites which have produced significant information on mortuary practices (e.g., Byers 1979; Ritchie 1945; Tuck 1976). Research which has been done in this area is of particular interest to this study because of the interests in Archaic settlement and subsistence systems, as well as mortuary behavior (Bourque 1976; Dincauze 1975). Cremation cemeteries are well known from the Northeast (Dincauze 1968), but, unfortunately, preservation of non-calcined bone is

extremely poor at many sites. This fact renders investigation of primary versus secondary burial difficult, and the nature of cremated remains makes sex and age information sparse, thus limiting evaluations of aggregation and dispersal sites using mortuary information. Integration of mortuary data into interpretations of group organization and seasonal variation have been attempted or considered in the Northeast (Robbins 1968; Rothschild 1983; Tuck 1976). Robbins (1968:75-76) makes these comments concerning secondary cremations and the possibility of seasonal occupation at Wapanucket No. 6, a component dating to about 4300 B.P. and located by a freshwater lake in Massachusetts.

> The presence of the ceremonial deposits seems to suggest that when the family groups assembled for the spring fishing they brought with them the remains of those who had died during the winter, to be buried with the ritual considered necessary to their future welfare. The skeletons of the deceased may have been cremated at the winter camps to facilitate their transportation to the burial site.

These remarks by Robbins (1968) were especially intriguing in that I had independently arrived at a similar interpretation of the use of cremation burial during the Archaic in the Middle South. Much of the remaining argument presented by Robbins can be accommodated by the model presented here, although there are several specific aspects of his interpretation with which I am not in full agreement.

In a comparison between the mortuary programs represented by remains from the Port au Choix site in Newfoundland (Tuck 1970, 1971, 1976) and the Frontenac Island site in New York (Ritchie 1945), Rothschild (1983: 180, note 2) considers the possibility of seasonal

variation on mortuary practices, but found the information inadequate to evaluate the ideas presented. The age and sex distributions of the burials from these two sites are summarized by Rothschild (1983:Figure 1). The Frontenac Island sample is comparable to the aggregation site pattern with a predominance of adults (79 percent), especially males, and an under-representation of children. At Port au Choix there was a more equitable distribution with about 54 percent adults, 45 percent sub adults, and a more even distribution of adults by sex. Despite Rothschild's (1983:171) interpretation that these data may indicate differences in the "status niche for children" at the two sites, I argue that these mortality distributions make sense given the differences in interpretations of site occupations and organization of the two groups.

Frontenac Island is interpreted (Ritchie 1945:25) as a seasonal (spring-summer) fishing camp. If Frontenac were also a short term, but repeatedly used, aggregation site for groups who spent the preceding season as fissioned subsistence groups on the mainland, then the mortality distribution is consistent with expectations of the G+A+S+R+O+C model.

Port au Choix, on the other hand, is interpreted as having been a semi-permanent habitation (fishing, sea mammal hunting) site during the spring and summer, out of which logistical hunting activities were conducted. During the late fall and winter, small bands supposedly went interior from the coast to hunt caribou and other animals (Tuck 1976:84-86). The relatively long-term annually recurrent occupation of the Port au Choix site may have resulted in

the burial of a more representative cross section of the population at the site. The occurrence of bundle burials at Port au Choix is of interest in that the situational problem of frozen ground is again confronted. Tuck (1970) indicates that "skeletons were found in all stages of decomposition, which suggests that people who had died during the winter were not buried until the ground thawed in spring or early summer." Tuck (1976:15) also suggests that bundle burials ". . . could be individuals who died in winter when ground digging was impossible in the frozen ground of Port au Choix."

These remarks are only intended to illustrate that the use of the G+A+S+R+O+C model in approaching hunter-gatherer mortuary behavior may facilitate interpretation of patterning from the perspective of operating cultural systems. In contrast, concepts of status differentiation and cultural variation have little predictive value or potential for enhancing broad scale interpretations or explanations of hunter-gatherer variability, either in terms of group organization or mortuary practices.

## Summary

The intent of this chapter has been to provide an initial feel for how the G+A+S+R+O+C model of hunter-gatherer mortuary variability may hold up on confrontation with the archaeological record. Consideration has been given to several expected correlations at a regional and local level. The behavior of hunter-gatherer groups often changed in patterned ways, both organizationally and in terms of specific activities, dependent upon

seasonally variable economic and social factors. Also, economic territory size was generally quite large when long term land use patterns are considered (Binford 1983b). Social and economic flexibility within hunter-gatherer groups generally required that such groups utilize a variety of site types, often covering a substantial geographical area. Given these considerations, it is arguably unrealistic to expect to develop plausible interpretations of hunter-gatherer mortuary behavior through study of isolated sites. A basic tenet of this study is that the nature of group organization and mobility impacted, often in a very direct manner, the treatment of the dead and resulted in distinctive patterning in the archaeological record. Such patterning, however, may vary substantially from site to site, even among burials interred by the same group.

The Ervin site served as a starting point for this analysis, and is an excellent example for indicating that small samples from single sites will generally provide information on only a portion of the overall burial program of many mobile groups. The regional approach to interpretation of hunter-gatherer mortuary variability taken here introduces both strengths and weaknesses. Strengths come from the enhanced potential for recognition of overall patterns and the ability to identify unusual or outlying cases. Weaknesses derive from uneven recovery and reporting of samples and the inherent difficulty in determining the degree of cultural relationship between archaeological components. In the past, emphasis has been given primarily to the interpretation of specific Archaic mortuary samples,

with relatively little apparent concern for the problems of variability and change at a regional level (Buikstra 1981; Charles and Buikstra 1983). It may simply be inappropriate to expect patterning at single sites to reveal the overall mortuary program used by many hunter-gatherer groups in the past.

The gender, age, and status (G+A+S model) framework for interpreting mortuary variability has proven to be of great utility in the explanation of patterning among sedentary cultural groups. In this study, however, several assumptions used in the analysis of sedentary group mortuary activity have been questioned as to their appropriateness for groups exhibiting various kinds of mobility. Specifically, there is strong evidence during the Archaic, when the Middle South is considered as a whole, that the extra energy and processing effort needed for secondary burial may not relate in a direct fashion with status variation. The occurrence of non-perishable artifact associations is significantly more common for primary burials than for secondary interments. In addition, non-utilitarian artifacts, some of which might be construed as status markers, are no more common for secondary burials than primary burials. If secondary burial was a form of status differentiation expressed at the time of death, then it was implemented relatively independently of the use of artifactual offerings. Such offerings have also commonly been used to evaluate differences in status. Though admittedly only a crude measure has been used, there is apparently no direct link between secondary burial and status during the Archaic in the Middle South.

Because of the problems of recognition and reporting secondary burial, proposed relationships between organizational variability and mortuary behavior were approached using mortality distributions. The kinds of differences in intersite mortality distributions which previous researchers have attributed to differential treatment of individuals of different status (Buikstra 1981), or to problems of sample representativeness (Blakely 1971), are here argued to also reflect differences in the nature of site occupations which result from organizational flexibility in Archaic social-subsistence groups. The configuration of some Archaic site mortality profiles, such as that from Indian Knoll, have been considered incomplete, defective, distorted, or "abnormal" by some researchers (e.g., Blakely 1971; Weiss 1973:11), because they do not correspond well to expected distributions for stationary-sedentary populations.

These variations in Archaic site mortality distributions have here been shown to make relatively good sense when considered from the perspective of aggregation and dispersal of hunter-gatherer groups. Aggregation sites were of particular social significance, and individuals of importance beyond the family level tended to receive final burial during periods of group aggregation. Aggregations were not economically feasible, however, unless dependable and predictable food resources were available to support the aggregate group at least for a short time. For this reason, shell middens are argued to have served as aggregation sites on many occasions in the past, because of the temporal/spatial reliability of the shellfish resource and the generally rich environment in which

they occur. Burials at such sites, then, are expected to include a high proportion of individuals who were of importance to the aggregate group as a whole. This probably most often included active adults who were economically and reproductively active. Sites occupied by dispersed family groups are more likely to contain burials of those important primarily at the family level (infants and old adults). Given such a scenario, the potential for distinctive mortality distributions at different sites used by the same cultural group is high.

Diachronic variation has also been documented in several instances, but using different kinds of mortuary information. In the central Duck River area, a general decrease in the frequency of secondary burial is noted between Middle and Late Archaic sites. This pattern is in keeping with the overall model of regional Archaic organizational change to increasing reliance on logistical mobility as population increased and territory sizes decreased. A similar, though less dramatic change is evidenced between the Refuge-Deptford and St. Catherines period occupations on St. Catherines Island off the Georgia coast.

In the western Tennessee Valley the Eva and Cherry sites provided interesting information on mortality distributions which apparently changed in concert with changing economic and social activities at these sites. The mortality distribution at the Eva site changed from the aggregate group burial pattern (with a strong representation of active adults between 20 and 35 years old), to the family group burial pattern (dominated by very young and very old

individuals) between 7000 and 3500 years ago. The Late Archaic Cherry site mortality distribution is comparable to that from the early Eva site components, and there may be evidence for a shift from use of the Eva site as an aggregation site during the Middle Archaic, to its use as a subsistence group camp during the Late Archaic. Cherry may have been one of the sites which fulfilled the function of aggregation site during the Ledbetter phase occupation of the western Tennessee Valley. The presence of an aggregate group burial pattern at these sites correlates well with the exploitation of shellfish, as would be expected given available models of Archaic group organization which have been developed for the region.

# VIII. THE MODEL RECONSIDERED: IMPLICATIONS AND APPLICATIONS

> It is model building and testing in the context of comparative studies of patterning and their implied organizational characteristics which will greatly expand our knowledge of the past. (Binford 1972:456)

Archaeologists are not yet able to confidently and reliably identify various types of mobility patterns or group organizational strategies based on the archaeological record. Knowledge of such past systems, and the ability to recognize them archaeologically, is critical in order to enhance our understanding of the operation and variation of cultural systems in a wide range of situations, to facilitate the study of change in these systems, and to gain an appreciation for why some human groups were "successful" or stable for long periods while others were not. Such information could lead to a better understanding of the nature of changes in, and the operation of, many different cultures, and may ultimately be extremely important for decision making concerning the present and future maintenance of viable human organizations.

Human social systems represent trajectories of change and continuity. Historical (evolutionary) perspective and study of the past is critical to understanding and interpretation of the present (Gellner 1958), which is in turn highly relevant to discussions about the future. Otherwise, we must concede that the cultural present is understandable purely in terms of itself, and we are left with no explanatory framework for interpreting change and variability. Synchronic or purely functional interpretations of cultural behavior

tend ultimately to result in the conclusion that systems were organized or functioned in particular ways because they were "adaptive." From a historical perspective, however, it is obvious that not all organizations were equally adaptive and it is also evident that the more powerful or complexly integrated systems are not always the more durable ones. We have the opportunity to learn from previous cultural "experiments" and should be capable of using this information for some advantage. This, however, requires an ability to effectively interpret the archaeological record.

Anthropological and humanistic concerns, such as the origin of distinctly human behavior patterns and the development of sedentary lifeways, require the ability to recognize different organizational patterns through archaeological remains, and to recognize variations and changes in these patterns. Many organizational configurations probably existed in the past for which there are no direct modern analogues. One important goal of archaeology is to document the nature of these past human lifeways and to determine the underlying factors in their operation, successes, failures, or transformations. The ability to use archaeological remains to benefit these interests requires development of unambiguous linkages between specific behaviors or behavior patterns and the material correlates of these behaviors. Toward this end ethnoarchaeology and historical archaeology can make significant contributions by developing controls (unambiguous controlled case studies) which can be used to help interpret patterns of known form and novel patterns as well.

Development of archaeological method and theory must also proceed through the investigation of those prehistoric materials for which we have no immediate analogues or standardized conventions for giving meaning to the static remains. Concomitant research in different aspects of archaeology including actualistic studies, pattern recognition studies, theoretical modeling, simulation, and so forth are collectively important to enhancing understanding of the past, and cultural behaviors in general (Binford 1983a). Archaeological resources are limited in occurrence and many kinds of archaeological resources are dwindling in number much more rapidly than they are being studied. It is imperative, therefore, that pattern recognition studies of prehistoric archaeological remains continue hand-in-hand with more theoretical and actualistic studies. Archaeological remains potentially contain a considerable amount of information about the mobility and organizational parameters of the cultural groups who deposited them (Binford 1978a, 1979, 1983a). Recognition of patterning in the archaeological record which may pertain to aspects of group organizational variability and mobility is, therefore, theoretically feasible to obtain. It is also necessary and potentially very important to a number of long-range anthropological goals or issues, including the transition from hunting and gathering to food production.

With these general thoughts in mind, it is considered important to continue to develop the various avenues of investigation which may lead to more realistic and more complete interpretation of prehistoric mobility and organizational variation. The study of

mortuary practices is one area which has potential in this regard. The present investigation of mortuary practices among hunter-gatherer groups is of importance in three ways, regardless of the correctness of the model's details or specific interpretations based on it. First, based on shards of ethnographic and archaeological evidence, a model has been constructed which provides a general framework for approaching the study of mortuary practices among variously mobile or semi-mobile groups. This model outlines expectations about the nature of some aspects of burial programs which will occur in given organizational systems. Also, it sets forth testable predictions about how the mortuary remains should pattern among groups for which aspects of organization and mobility are known, or are independently interpreted based on other lines of evidence.

Secondly, the study has outlined patterning in the archaeological record which is in need of further study in order to "verify" its true significance, but which may be of direct relevance to interpreting aspects of past hunter-gatherer organizations. The family group pattern and aggregate group pattern of mortality distributions, if shown to truly be the result of cultural behavior and not artifacts of sampling, recovery, or analysis, may provide a useful frame of reference for the investigation of many hunter-gatherer burial programs. The significance of intermediate patterns also needs to be investigated. Patterning has also been illustrated to occur in the nature of cremation remains dependent upon various excavation and recovery techniques. The potentially detrimental influence of not recognizing bundle burials or secondary cremations

has been documented as a factor which can severely inhibit complete and productive interpretation of mortuary remains.

Finally, ambiguities in the interpretation of mortality patterns have been indicated. Attributing meaning to the archaeological record is not a straight-forward process, but requires continued reevaluation of conventions and interpretive frameworks as information accumulates, counter-instances begin to pattern, and as perspectives change. This study has questioned the most commonly used approach of interpreting mortuary patterning in North American Archaic sites on the basis of age, sex and status differentiation (the G+A+S model). Not because it is necessarily incorrect, but because it is necessarily incomplete. The patterns recognized here as family group and aggregate group burial sets, have elsewhere been interpreted to represent elite status group, versus "commoner" group burials. There can be no question as to the potential significance of status as a key factor influencing mortuary treatments. Neither can there be serious question that many if not most prehistoric groups (from a historical perspective) had organizational flexibility and were mobile to some greater or lesser extent. If there is one underlying conclusion in this study, it is that <u>mobility and organizational flexibility must not be ignored or underestimated when interpretations are made which assign behavioral meaning to the mortuary remains of hunter-gatherer groups</u>. To the extent that a specific group was more or less mobile or organizationally dynamic, the mortuary program of the group should be influenced in a concomitant manner.

Burial variability among hunter-gatherers, in terms of corpse treatment, cannot realistically be interpreted using models which offer age, sex, and status as sufficient explanatory elements. Furthermore, the level of energy expenditure, at least in terms of the number of stages in the burial program (as indicated here by primary versus secondary burial), has been shown not to correlate directly with status differentiation for Archaic groups in the Middle South United States. Variations may, and apparently often did, occur in the burial program as a result of factors which operated independently of the gender, age, and status (G+A+S) model. Neither can variation in burial practices, that "most conservative of rights," be treated simply as a factor of cultural differences, diffusion, or cultural-ideological change (Griffin 1930).

Hunter-gatherer cemeteries used over the course of several generations by groups with various mobility strategies can potentially inform us of a great deal about long term land use patterns. Such cemeteries may also provide information directly pertinent to the study of organizational variability within such groups. Anytime a cemetery is repeatedly employed by hunter-gatherers over a long period, it should represent the execution of pre-planned activity, and as such, will be orchestrated with (embedded in, Binford 1979) other aspects of overall group organization, and should belie some aspects of this organization. By way of contrast, situational events such as the death of an individual among unrestricted or free-wandering hunter-gatherers lacking well established cemetery areas (e.g., early Paleoindians in

the New World), may produce scattered burials that will inform us about specific circumstances of the group at the specific time and place of death, but relatively little about the overall organization or operation of the cultural system (cf. Todd 1983:231).

The primary difference in the currently in vogue G+A+S model of mortuary variability and the G+A+S+R+O+C model outlined here is the expressed concern for the impact of mobility on mortuary behavior, in combination with consideration of group organizational flexibility. Assumptions about group stability, sedentism, and composition which are central to most applications of the G+A+S model, are the very assumptions which we cannot accept as tenable when studying the mortuary practices of most hunter-gatherers or other mobile, seasonally mobile, or organizationally dynamic cultural groups.

# REFERENCES CITED

Abbie, A. A. 1969. The original Australians. New York: American Elsevier Publishing.

Albrethsen, S. E. and E. Brinch Petersen. 1977. Excavation of a Mesolithic cemetery at Vedbaek, Denmark. Acta Archaeologica 47:1-29.

Alekshin, V. A. 1983. Burial customs as an archaeological source. Current Anthropology 24(2):137-149.

Amick, Daniel S. 1984. Lithic raw material variability in the central Duck River Basin: Reflections of Middle and Late Archaic Period organizational strategies. Unpublished M.A. thesis, Department of Anthropology, University of Tennessee, Knoxville.

-------1985. "Excavations at the Fattybread Branch site (40MU408): Late Archaic floodplain adaptations", in Cultural adaptations in the Shelby Bend Archaeological District. Edited by D. S. Amick, J. M. Herbert, and M. E. Fogarty, pp. 290-416. Report submitted to the National Park Service, Southeast Archaeological Center. Tallahassee, Florida.

Asch, Nancy B., Richard I. Ford, and David L. Asch. 1972. Paleoethnobotany of the Koster site, the Archaic horizons. Illinois State Museum, Reports of Investigations 24.

Baby, Raymond S. 1954. Hopewell cremation practices. The Ohio Archaeological Society, Papers in Archaeology 1.

Bartel, Brad. 1982. A historical review of ethnological and archaeological analyses of mortuary practice. Journal of Anthropological Archaeology 1:32-58.

Bass, William M. 1984. "Is it possible to consume a body completely in a fire?," in Human identification: Case studies in forensic anthropology. Edited by Ted A. Rathbun and Jane E. Buikstra, pp. 159-167. Springfield: Charles C. Thomas.

Bass, William M. and Terrell W. Phenice. 1975. "Prehistoric human skeletal material from three sites in North and South Dakota," in The Sonota complex and associated sites on the northern Great Plains. By Robert W. Neuman, pp. 106-140. Nebraska State Historical Society, Publications in Anthropology 6.

Beardsley, Richard K., Preston Holder, Alex D. Krieger, Betty J.

Meggers, John B. Rinaldo, and Paul Kutsche. 1956. "Functional and evolutionary implications of community patterning," in Seminars in Archaeology: 1955. Edited by Robert Wauchope et al., pp. 129-157. Memoirs of the Society for American Archaeology 11.

Becker, Stan. 1981. Seasonality of fertility in Matlab, Bangladesh. Journal of Biosocial Science 13:97-105.

Bendann, Effie. 1930. Death customs: an analytical study of burial rites. London: Kegan, Paul, Trench, Truber, and Co.

Bettinger, Robert L. and Martin A. Baumhoff. 1982. The Numic spread: Great Basin cultures in competition. American Antiquity 47:485-503.

Bicchieri, M. G. Editor. 1972. Hunters and gatherers today. New York: Holt, Rinehart, and Wintston.

Biek, Leo. 1963. Archaeology and the microscope, the scientific explanation of archaeological evidence. London: Frederick A. Praeger.

Binford, Lewis R. 1963a. "The Pomranky site: A Late Archaic burial station," in Miscellaneous studies in typology and classification. A. M. White, et al. pp. 149-192. University of Michigan, Museum of Anthropology, Anthropological Papers 19.

--------. 1963b. "The Hodges site: A Late Archaic burial station," in Miscellaneous studies in typology and classification. A. M. White, et al. pp. 124-148. University of Michigan, Museum of Anthropology, Anthropological Papers 19.

--------. 1964. A consideration of archaeological research design. American Antiquity 29:425-441.

--------. 1971. "Mortuary practices: Their study and their potential," in Approaches to the social dimensions of mortuary practices. Edited by James A. Brown, pp. 6-29. Memoirs of the Society for American Archaeology 25.

--------. 1972. An archaeological perspective. New York: Seminar Press.

--------. 1975. "Sampling, judgment, and the archaeological record," in Sampling in Archaeology. Edited by James W. Mueller, pp. 251-257. Tucson: University of Arizona Press.

--------. 1976. "Forty-seven trips: A case study in the character of

some formation processes of the archaeological record," in Contributions to Anthropology: The interior peoples of northern Alaska. Edited by Edwin S. Hall, Jr. pp. 299-351. National Museums of Canada, National Museum of Man, Mercury Series Paper 49.

--------. 1977. "General introduction," in For theory building in archaeology. Edited by Lewis R. Binford, pp. 1-10. New York: Academic Press.

--------. 1978a. Nunamiut ethnoarchaeology. New York: Academic Press.

--------. 1978b. Dimensional analysis of behavior and site structure: Learning from an Eskimo hunting stand. American Antiquity 43:330-361.

--------. 1979. Organization and formation processes, looking at curated technologies. Journal of Anthropological Research 35:255-273.

--------. 1980. Willow smoke and dog's tails: Hunter-gatherer settlement systems and archaeological site formation. American Antiquity 45:4-20.

--------. 1982. The archaeology of place. Journal of Anthropological Archaeology 1:5-31.

--------. 1983a. In pursuit of the past. New York: Thames and Hudson.

--------. 1983b. Working at archaeology. New York: Academic Press.

--------. 1983c. "Long term land use patterns: Some implications for archaeology," in Lulu Linear Punctated: Essays in honor of George Irving Quimby. Edited by Robert C. Dunnell and Donald K. Grayson, pp. 27-53. University of Michigan, Museum of Anthropology, Anthropological Papers 72.

--------. 1984. An Alyawara day: Flour, spinifex gum and shifting perspectives. Journal of Anthropological Research 40:157-182.

--------. 1985. 'Brand X' versus the recommended product. American Antiquity 50:580-590.

Binford, Lewis R. and Sally R. Binford. 1966. A preliminary analysis of functional variability in the Mousterian of Levallois Facies. American Anthropologist 68(2, part 2):238-295.

Binford, Lewis R. and W. J. Chasko, Jr. 1976. "Nunamiut demographic history: A provocative case," in Demographic anthropology. Edited by Ezra B. W. Zubrow, pp. 63-143. Albuquerque: University of New Mexico Press.

Binford, Sally R. 1968. A structural comparison of disposal of the dead in the Mousterian and the Upper Paleolithic. Southwestern Journal of Anthropology 24:139-154.

Blakely, Robert L. 1971. Comparison of the mortality profiles of Archaic, Middle Woodland, and Middle Mississippian skeletal populations. American Journal of Physical Anthropology 34:43-54.

Bloch, Maurice and Jonathan Parry. Editors. 1982. Death and the regeneration of life. Cambridge: Cambridge University Press.

Boas, Franz. 1964. The Central Eskimo. Lincoln: University of Nebraska Press.

Botkin, Steven. 1980. "Effects of human exploitation on shellfish populations at Malibu Creek, California," in Modeling change in prehistoric subsistence economies. Edited by T. K. Earle and A. L. Christenson, pp. 121-140. New York: Academic Press.

Bourque, Bruce J. 1976. The Turner Farm site: a preliminary report. Man in the Northeast 11:21-30.

Bowen, William Rowe. 1977. A reevaluation of Late Archaic subsistence and settlement patterns in the western Tennessee Valley. Tennessee Anthropologist 2:101-120.

Brakenridge, G. Robert. 1982. Alluvial stratigraphy and geochronology along the Duck River, central Tennessee: A history of changing floodplain sedimentary regimes. Unpublished Ph. D. dissertation, Department of Geosciences, University of Arizona.

--------. 1984. Alluvial stratigraphy and geochronology along the Duck River, central Tennessee: Implications regarding flood-plain origin. Geological Society of America Bulletin 95:9-25.

Braun, David P. 1979. "Illinois Hopewell burial practices and social organization: A re-examination of the Klunk-Gibson mound group," in Hopewell archaeology: The Chillicothe conference. Edited by David S. Brose and N'omi Greber, pp. 66-79. Kent: Kent State University Press.

--------. 1981. A critique of some recent North American mortuary studies. American Antiquity 46:398-416.

--------. 1984. Burial practices, material remains, and the anthropological record. Reviews in Anthropology 11:185-196.

Brehm, H. C. 1981. The history of the Duck River cache. Tennessee

Anthropological Association, Miscellaneous Paper 6.

Brown, James A. Editor. 1971a. Approaches to the social dimensions of mortuary practices. Memoirs of the Society for American Archaeology 25.

--------. 1971b. "The dimensions of status in the burials at Spiro," in Approaches to the social dimensions of mortuary practices. Edited by James A. Brown, pp. 92-112. Society for American Archaeology Memoir 25.

--------. 1976. Spiro studies volume 4: The artifacts. University of Oklahoma Research Institute. Norman.

--------. 1981. "The search for rank in prehistoric burials," in The archaeology of death. Edited by Robert Chapman, Ian Kinnes, and Klavs Randsborg, pp. 25-37. Cambridge: Cambridge University Press.

--------. 1985. "Long-term trends to sedentism and the emergence of complexity in the American Midwest," in Prehistoric hunter-gatherers, the emergence of cultural complexity. Edited by T. Douglas Price and James A. Brown, pp. 201-231. New York: Academic Press.

Brown, Tracy. 1982a. Prehistoric mortuary patterning and change in the Normandy Reservoir, Coffee County, Tennessee. Unpublished M.A. thesis, Department of Anthropology, University of Tennessee, Knoxville.

--------. 1982b. "Archaeological components at the Parks site," in Seventh report of the Normandy Archaeological Project. Edited by Charles H. Faulkner and Major C. R. McCollough, pp. 353-537. University of Tennessee, Department of Anthropology, Report of Investigations 32.

Brown, Tracy and Ann Magennis. 1982. "Laboratory analysis of cremated human remains," in Seventh report of the Normandy Archaeological Project. Edited by Charles H. Faulkner and Major C. R. McCollough, pp. 446-464. University of Tennessee, Department of Anthropology, Report of Investigations 32.

Buikstra, Jane E. 1976. Hopewell in the Lower Illinois River Valley: A regional approach to the study of human biological variability and prehistoric behavior. Northwestern University Archaeological Program, Scientific Papers 2.

--------. 1981. "Mortuary practices, palaeodemography and

palaeopathology: A case study from the Koster site (Illinois)," in The archaeology of death. Edited by Robert Chapman, Ian Kinnes, and Klavs Randsborg, pp. 123-132. Cambridge: Cambridge University Press.

Buikstra, Jane E. and Lynne Goldstein. 1973. The Perrins Ledge crematory. Illinois State Museum, Reports of Investigations 28.

Bushnell, David I., Jr. 1920. Native cemeteries and forms of burial east of the Mississippi. Bureau of American Ethnology, Bulletin 71.

--------. 1927. Burials of the Algonquian, Siouan and Caddoan tribes west of the Mississippi. Bureau of American Ethnology, Bulletin 83.

Butler, Brian M. 1977. The Yearwood site: A specialized Middle Woodland occupation on the Elk River. Tennessee Anthropologist 2:1-15.

Byers, Douglas S. 1979. The Nevin shellheap: Burials and observations. Papers of the R. S. Peabody Foundation for Archaeology 9.

Campbell, John M. 1968. "Territoriality among ancient hunters: Interpretations from ethnography and nature," in Anthropological archaeology in the Americas. Edited by Betty Meggers, pp. 1-21. The Anthropological Society of Washington.

Cashdan, Elizabeth A. 1980. Egalitarianism among hunters and gatherers. American Anthropologist 82:116-120.

Chapman, Robert. 1981. "The emergence of formal disposal areas and the °problem' of megalithic tombs in prehistoric Europe," in The archaeology of Death. Edited by Robert Chapman, Ian Kinnes, and Klavs Randsborg, pp. 71-81. Cambridge: Cambridge University Press.

Chapman, Robert, Ian Kinnes, and Klavs Randsborg. Editors. 1981. The archaeology of death. Cambridge: Cambridge University Press.

Chapman, Robert and Klavs Randsborg. 1981. "Approaches to the archaeology of death," in The archaeology of death. Edited by R. Chapman, I. Kinnes, and K. Randsborg, pp. 1-24. Cambridge: Cambridge University Press.

Chapman, Jefferson. 1977. Archaic period research in the lower Little Tennessee River Valley-1975: Icehouse Bottom, Harrison Branch, Thirty Acre Island, Calloway Island. University of Tennessee, Department of Anthropology, Report of Investigations 18.

--------. 1981. The Bacon Bend and Iddins sites: The Late Archaic period in the lower Little Tennessee River Valley. University of Tennessee, Department of Anthropology, Report of Investigations 31.

Charles, Douglas K. and Jane E. Buikstra. 1983. "Archaic mortuary sites in the central Mississippi drainage: Distribution, structure and behavioral implications," in Archaic hunters and gatherers in the American midwest. Edited by James L. Phillips and James A. Brown, pp. 117-145. New York: Academic Press.

Childe, V. Gordon. 1945. Directional changes in funerary practices during 50,000 years. Man 45:13-19.

Claflin, William H., Jr. 1931. The Stalling's Island mound, Columbia Co., Georgia. Harvard University, Peabody Museum of American Archaeology and Ethnology, Papers 14(1).

Clarke, David L. 1972. "Models and paradigms in contemporary archaeology," in Models in archaeology. Edited by David L. Clarke, pp. 1-60. London: Methuen and Co.

Clow, Richmond L. Editor. 1982. Autobiography of Mary C. Collins, missionary to the western Sioux. South Dakota Historical Collections 41:1-66.

Cohen, Mark Nathan. 1977. The food crisis in prehistory, overpopulation and the origins of agriculture. New Haven: Yale University Press.

--------. 1985. "Prehistoric hunter-gatherers: The meaning of social complexity," in Prehistoric hunter-gatherers, the emergence of cultural complexity. Edited by T. Douglas Price and James A. Brown, pp.99-119. Orlando: Academic Press.

Conkey, Margaret W. 1980. The identification of prehistoric hunter-gatherer aggregation sites: The case of Altamira. Current Anthropology 21:609-630.

Cowgill, Ursula M. 1966a. The season of birth in man. Man 1:232-240.

--------. 1966b. Season of birth in man: Contemporary situation with special reference to Europe and the southern hemisphere. Ecology 47:614-623.

--------. 1966c. The season of birth in man: The northern New World. Papers of the Kroeber Anthropological Society 35:1-21.

Damas, David. 1968. "The diversity of Eskimo societies," in Man the

hunter. Edited by Richard B. Lee and Irven DeVore, pp. 111-117. Chicago: Aldine.

--------. Editor. 1969a. Contributions to Anthropology: Band societies. National Museums of Canada, National Museum of Man, Bulletin 228.

--------. 1969b. "Characteristics of Eskimo band structure," in Contributions to Anthropology: Band societies. Edited by David Damas National Museums of Canada, National Museum of man, Bulletin 228.

Davidson, Daniel Sutherland. 1949. Disposal of the dead in western Australia. Proceedings of the American Philosophical Society 93(1):71-97.

DeJarnette, David L., E. B. Kurjack, and J. W. Cambron. 1962. Stanfield-Worley Bluff Shelter excavations. Journal of Alabama Archaeology 8 (1 and 2).

Dincauze, Dena F. 1968. Cremation cemeteries in eastern Massachusetts. Papers of the Peabody Museum of Archaeology and Ethnology 59(1).

--------. 1975. The Late Archaic period in southern New England. Arctic Anthropology 12(2):23-34.

Dixon, Roland B. 1971. "Death and burial among the Northern Maidu," in The California Indians, a source book. Edited by R. F. Heizer and M. A. Whipple, pp. 500-512. Berkeley: University of California Press.

Dowd, John T. 1981. The Anderson site (40WM9). Tennessee Anthropological Association Newsletter 6(5):1-2.

--------. 1985. The Anderson site: Middle Archaic adaptation in Tennessee's Central Basin. Ms. in possession of author.

Driskell, Boyce N. 1979. "The Rosenberger site (15JF18)," in Excavations at four Archaic sites in the lower Ohio Valley, Jefferson County, Kentucky (2 volumes). Edited by Michael B. Collins, pp. 697-803. University of Kentucky, Department of Anthropology, Occasional Papers in Anthropology 1.

Drucker, Philip. 1963. Indians of the Northwest Coast. Garden City: Natural History Press.

Dunnell, Robert C. 1972. The prehistory of Fishtrap Kentucky. Yale University Publications in Anthropology 75. New Haven.

--------. 1982. Science, social science, and common sense: The

agonizing delimma of modern archeology. Journal of Anthropological Research 38:1-25.

Dunnell, Robert C. and Jan Simek. 1984. What does the archaeological record mean? Reviews in Anthropology 11:1-11.

Durham, William H. 1981. "Overview: Optimal foraging analysis in human ecology," in Hunter-gatherer foraging strategies. Edited by Bruce Winterhalder and Eric A. Smith, pp. 218-231. Chicago: University of Chicago Press.

DuVall, Glyn D. 1982. "The Ewell III site (40CF118)," in Seventh report of the Normandy archaeological project. Edited by Charles H. Faulkner and Major C. R. McCollough, pp. 8-151. University of Tennessee, Department of Anthropology, Report of Investigaitons 32.

Dyson, T. and N. Cook. 1979. Season of births and deaths in developing countries," in Proceedings of conference on seasonal dimensions to rural poverty. Brighton: University of Sussex.

Dyson-Hudson, Rada and Eric Alden Smith. 1978. Human territoriality: An ecological reassessment. American Anthropologist 80:21-41.

Ebert, James I. 1979. "An ethnoarchaeological approach to reassessing the meaning of variability in stone tool assemblages," in Ethnoarchaeology: Implications of ethnography for archaeology. Edited by Carol Kramer, pp. 59-74. New York: Columbia University Press.

Eder, James F. 1984. The impact of subsistence change on mobility and settlement pattern in a tropical forest foraging economy: Some implications for archaeology. American Anthropologist 86:837-853.

Ember, Carol R. 1978. Myths about hunter-gatherers. Ethnology 17:439-448.

Flannery, Kent V. 1968. "Archaeological systems theory and early Mesoamerica," in Anthropological archaeology in the Americas. Edited by Betty J. Meggers, pp. 67-87. Anthropological Society of Washington.

Ford, Richard I. 1977. "Evolutionary ecology and the evolution of human ecosystems: A case study from the Midwestern U.S.A.," in Explanation of prehistoric change. Edited by James N. Hill, pp. 153-184. Albuquerque: University of New Mexico Press.

Fowler, Melvin L. 1959. Modoc Rock Shelter, a summary and analyses of four seasons of excavation. Illinois State Museum, Report of Investigations 8.

Fowke, Gerard. 1922. Archeological investigations. Part I. Cave explorations in the Ozark region of central Missouri. Part II. Cave explorations in other states. Bureau of American Ethnology, Bulletin 76.

Fried, Morton. 1967. The evolution of political society. New York: Random House.

Furuhata, Tanemoto and Katsuihi Yanamoto. 1967. Forensic odontology. Tokyo: Oshiyaku Publications.

Futato, Eugene. 1983. Archaeological investigations in the Cedar Creek and Upper Bear Creek reservoirs. University of Alabama, Office of Archaeological Research, Report of Investigations 29.

Galm, Jerry R. and Jack L. Hofman. 1984. The Billy Ross site: analysis of a Dalton component from the southern Arkansas Basin of Eastern Oklahoma. Bulletin of the Oklahoma Anthropological Society 33:37-73.

Gejvall, Nils-Gustaf. 1969. "Cremations," in Science in archaeology (second edition). Edited by Don. Brothwell and Eric Higgs, pp. 468-479. New York: Praeger.

Gellner, Ernest. 1958. Time and theory in social anthropology. Mind 67:182-202.

Gilbert, B. Miles and William M. Bass. 1967. Seasonal dating of burials from the presence of fly pupae. American Antiquity 32:534-535.

Gluckman, M. 1937. Mortuary customs among the south-eastern Bantu. Bantu Studies 11:117-136.

Goldstein, Lynne G. 1980. Mississippian mortuary practices, a case study of two cemeteries in the lower Illinois Valley. Northwestern University Archaeological Program, Scientific Papers 4.

Goody, Jack. 1959. Death and social control among the LoDagaa. Man 59:134-138.

Gordon, C. and Jane Buikstra. 1981. Soil pH, bone preservation, and sampling bias at mortuary sites. American Antiquity 46:566-570.

Gorman, Frederick. 1972. "The Clovis hunters: An alternative view of their environment and ecology," in Contemporary archaeology. Edited by Mark P. Leone, pp. 206-221. Carbondale: Southern Illinois University Press.

Gould, Richard A. 1963. Aboriginal California burial and cremation practices. Reports of the University of California Archaeological Survey 60:149-168.

--------. 1980. Living archaeology. Cambridge: Cambridge University Press.

--------. Editor. 1978. Explorations in ethnoarchaeology. Albuquerque: University of New Mexico Press.

Gould, Richard A. and Patty Jo Watson. 1982. A dialogue on the meaning and use of analogy in ethnoarchaeological reasoning. Journal of Anthropological Archaeology 1:355-381.

Griffin, James B. 1930. Aboriginal mortuary customs in the western half of the Northeast Woodlands area. Unpublished M.A. thesis. Department of Anthropology, University of Chicago.

Haglund, Laila. 1976a. Disposal of the dead among Australian aborigines: Archaeological data and interpretations. University of Stockholm, Institute of Archaeology, Theses and Papers in North-European archaeology 5.

--------. 1976b. An archaeological analysis of the Broadbeach aboriginal burial ground. St. Lucia: University of Queensland Press.

Harpending, H. and H. Davis. 1978. Some implications for hunter-gatherer ecology derived from the spatial structure of resources. World Archaeology 8:275-283.

Harrington, Mark Raymond. 1960. The Ozark Bluff-dwellers. Museum of the American Indian, Heye Foundation, Indian Notes and Monographs 12.

Harris, David R. 1977. "Settling down: An evolutionary model for the transformation of mobile bands into sedentary communities," in The evolution of social systems. Edited by J. Friedman and M. J. Rowlands, pp. 401-417. London: Duckworth.

Harrold, Francis B. 1980. A comparative analysis of Eurasian Palaeolithic burials. World Archaeology 12:195-211.

Harten, Lucille B. 1980. "The osteology of the human skeletal

material from the Braden site in western Idaho," in Anthropological papers in memory of Earl H. Swanson, Jr. Edited by L. B. Harten, C. N. Warren, and D. R. Tuohy, pp. 130-148. Special Publication of the Idaho Museum of Natural History. Pocatello.

Hayden, Brian M. 1981a. "Subsistence and ecological adaptations of modern hunter/gatherers," in Omnivorous primates, gathering and hunting in human evolution. Edited by R. S. O. Harding and Geza Teleki, pp. 344-421. New York: Columbia University Press.

--------. 1981b. Research and development in the stone age: Technological transitions among hunter-gatherers. Current Anthropology 22:519-548.

Hayden, Julian D. 1985. Food animal cremations of the Sierra Pinacate, Sonora, Mexico. Kiva 50:237-248.

Heffley, Sheri. 1981. "The relationship between Northern Athapaskan settlement patterns and resource distribution: An application of Horn's model," in Hunter-gatherer foraging strategies. Edited by Burce Winterhalder and Eric A. Smith, pp. 126-147. Chicago: University of Chicago Press.

Herbert, Joseph M. 1985. "Archaeological investigations at the Oldroy site (40HI131): The Wade phase and terminal Late Archaic/Early Woodland adaptations," in Cultural adaptations in the Shelby Bend Archaeological District. Edited by D. S. Amick, J. M. Herbert, and M. E. Fogarty, pp. 135-202. Report submitted to the National Park Service Southeastern Archaeological Center, Tallahasse.

Hertz, Robert. 1960. Death and the right hand. Glencoe: Free Press.

Hewitt, John. 1983. Optimal foraging models for the lower Illinois Valley. Unpublished Ph.D. dissertation, Department of Anthropology, Northwestern University.

Hiatt, B. 1969. Cremation in aboriginal Australia. Mankind 7:104-119.

Hitchcock, Robert K. "Patterns of sedentism among the Basarwa of eastern Botswana," in Politics and history in band societies. Edited by Eleanor Leacock and Richard Lee, pp. 223-268. Cambridge: Cambridge University Press.

Hofman, Jack L. 1983. Ervin: A mid-Holocene shell midden on the Duck River, a consideration of significance and research orientation. Report submitted to the Tennessee Valley Authority, Cultural Resources Branch, Norris, Tennessee.

--------. 1984a. Radiocarbon dates from Ervin: A mid-Holocene shell

midden on the Duck River in Middle Tennessee. Tennessee Anthropological Association Newsletter 9(2):2-8.

--------. 1984b. Hunter-gatherers in the Nashville Basin of Tennessee, 8000-5000 B.P. Tennessee Anthropologist 9:129-192.

--------. 1985a. "Middle Archaic ritual and shell midden archaeology: Considering the significance of cremations," in Exploring Tennessee Prehistory: A dedication to Alfred K. Guthe. Edited by T. Whyte, C. C. Boyd, Jr., and B. Riggs, pp. 1-21. University of Tennessee, Department of Anthropology, Report of Investigations 42.

--------. 1985b. Hunter-gatherer mortuary variability: The impact of mobility. Paper presented at the 50th annual meeting of the Society for American Archaeology, Denver.

--------. 1985c. Cave Spring: Contextual studies of an Eva component on the Duck River, Middle Tennessee. University of Tennessee, Department of Anthropology, Report of Investigations 45. in press.

Holmberg, Allan R. 1969. Nomads of the long bow. Garden City: Natural History Press.

Hudson, Charles. 1976. The Southeastern Indians. Knoxville: The University of Tennessee Press.

Humphreys, S. C. and Helen King. Editors. 1981. Mortality and immortality: The anthropology and archaeology of death. New York: Academic Press.

Jacobsen, T. W. and Tracey Cullen. 1981. "A consideration of mortuary practices in Neolithic Greece: Burials from Franchthi Cave," in Mortality and immortality: The anthropology and archaeology of death. Edited by S. C. Humphreys and Helen King, pp. 79-101. London: Academic Press.

James, Edwin O. 1928. Cremation and the preservation of the dead in North America. American Anthropologist 30:214-242.

Janzen, D. E. 1977. "An examination of Late Archaic development in the Falls of the Ohio area," in For the director: Research essays in honor of James B. Griffin. Edited by Charles E. Cleland, Jr. pp. 123-143. University of Michigan, Museum of Anthropology, Anthropological Papers 61.

Jefferies, Richard W. 1982. "Archaeological overview of the Carrier Mills district," in The Carrier Mills Archaeological project, human adaptation in the Saline Valley, Illinois (2 volumes). Edited by R. W. Jefferies and B. M. Butler, pp. 1461-1509.

Southern Illinois University, Center for Archaeological Investigations, Research Paper 33.

Jefferies, Richard W. and B. Mark Lynch. 1983. "Dimensions of Middle Archaic cultural adaptation at the Black Earth site, Saline County, Illinois," in Archaic hunters and gatherers in the American Midwest. Edited by J. L. Phillips and J. A. Brown, pp. 299-322. New York: Academic Press.

Jenness, Diamond. 1935. The Ojibwa Indians of Parry Island, their social and religious life. National Museum of Canada, Bulletin 78, Anthropological Series 17.

Jochim, Michael A. 1976. Hunter-gatherer subsistence and settlement: A predictive model. New York: Academic Press.

Joerschke, Bonnie. 1983. The demography, long bone growth, and pathology of a Middle Archaic skeletal population from middle Tennessee: The Anderson site (40WM9). Unpublished M.A. thesis, Department of Anthropology, University of Tennessee.

Johnston, Francis E. and Charles E. Snow. 1961. The reassessment of the age and sex of the Indian Knoll skeletal population: Demographic and methodological aspects. American Journal of Physical Anthropology 19:237-244.

Jones, Peter. 1869. History of the Ojebway Idians, with special reference to their conversion to Christianity. London.

Keene, Arthur S. 1981. Prehistoric foraging in a temperate forest, a linear programming model. New York: Academic Press.

Kelly, Robert L. 1983. Hunter-gatherer mobility strategies. Journal of Anthropological Research 39:277-306.

--------. 1985. Technology and hunter-gatherer mobility: A method. Paper presented at the 50th annual meeting of the Society for American Archaeology. Denver.

King, Thomas F. 1978. "Don't that beat the band? Nonegalitarian political organization in prehistoric central Califronia," in Social Archaeology, Beyond subsistence and dating. Edited by Charles L. Redman, et al., pp. 225-248. New York: Academic Press.

Kline, Gerald W. 1984. "Descriptive framework of the Averbuch lithic analysis" in Averbuch, a Late Mississippian manifestation in the Nashville Basin. Edited by Walter E. Klippel and William M. Bass, pp. II.8.1-43. Report submitted to the National Park Service, Southeastern Archaeological Division. Atlanta.

Klippel, Walter E. 1977. Prehistoric cultural adaptation to Holocene environements in Middle Tennessee. Proposal submitted to the Tennessee Valley Authority, Cultural Resources Branch. Norris.

--------. 1980. Determination of eligibility for the Columbia Reservoir archaeological district. Report submitted to the Tennessee Valley Authority, Cultural Resources Branch. Norris.

Klippel, Walter E. and James Maddox. 1977. The Early Archaic of Willow Branch. Midcontinental Journal of Archaeology 2:99-130.

Kramer, Carol. Editor. 1979. Ethnoarchaeology: Implications of ethnography for archaeology. New York: Columbia University Press.

Kroeber, Alfred L. 1925. Handbook of the Indians of California. Bureau of American Ethnology, Bulletin 78.

--------.1927. Disposal of the dead. American Anthropologist 29:308-315.

Larson, Clark Spencer. 1982. The anthropology of St. Catherines Island 3. Prehistoric human biological adaptation. Anthropological Papers of the American Museum of Natural History. 57(3).

Larson, Clark Spencer and David H. Thomas. 1982. The anthropology of St. Catherines Island 4. The St. Catherines Period mortuary complex. Anthropological Papers of the American Museum of Natural History 57(4).

Larson, Lewis H., Jr. 1971. "Archaeological implications of social stratification at the Etowah site, Georgia," in Approaches to the social dimensions of mortuary practices. Edited by James A. Brown, pp. 58-67. Society for American Archaeology Memoir 25.

Laughlin, William S. 1980. Aleuts: Survivors of the Bering land bridge. New York: Holt, Rinehart and Winston.

Lawson, P. V. 1907. The Winnebago tribe. Wisconsin Archaeologist 6:77-162.

Leacock, Eleanor and Richard B. Lee. 1982. Editors. Politics and history in band societies. Cambridge: Cambridge University Press.

Lee, Richard B. 1968. "What hunters do for a living, or, how to make out on scarce resources," in Man the Hunter. Edited by R. B. Lee and I. DeVore, pp. 30-48. Chicago: Aldine.

--------. 1976. "!Kung spatial organization: An ecological and historical perspective," in Kalahari hunter-gatherers. Edited by Richard B. Lee and Irven DeVore, pp. 73-97. Cambridge: Harvard University Press.

--------. 1979. The !Kung San: Men, women, and work in a foraging society. Cambridge: Cambridge University Press.

Lee, Richard B. and Irven DeVore. Editors. 1968. Man the Hunter. Chicago: Aldine.

--------. Editors. 1976. Kalahari hunter-gatherers. Cambridge: Harvard University Press.

Leshnik, Lawrence S. 1972. Pastoral nomadism in the archaeology of India and Pakistan. World Archaeology 4:150-166.

Lewis, T. M. N. and Madeline Kneberg. 1959. The Archaic culture in the Middle South. American Antiquity 25:161-183.

Lewis, T. M. N. and Madeline K. Lewis. 1961. Eva: An Achaic site. Knoxville: University of Tennessee Press.

Little, M. A. and P. W. Leslie. 1985. Human ecology of pastoral Turkana nomads: problems and progress in a multi-disciplinary study. Poster paper presented at the fifty-fourth annual meeting of the American Association of Physical Anthropologists, Knoxville.

Lowie, Robert H. 1948. "The tropical forest: An introduction," in Handbook of South American Indians, Volume 3, pp. 1-56. Bureau of American Ethnology, Bulletin 143.

Lurie, Rochelle. 1982. Economic models of stone tool manufacture and use: The Koster site Middle Archaic. Unpublished Ph.D. dissertation, Department of Anthropology, Northwestern University.

Lynch, B. Mark. 1982. "Mortuary behavior in the Carrier Mills archaeological district," in The Carrier Mills archaeological project, human adaptation in the Saline Valley, Illinois (2 volumes). Edited by Richard W. Jefferies and Brian Butler, pp. 1113-1231. Southern Illinois University, Center for Archaeological Investigations, Research Paper 33.

MacLeod, W. C. 1925. Certain mortuary aspects of Northwest Coast culture. American Anthropologist 27:122-148.

Magennis, Ann L. 1977. Middle and Late Archaic mortuary patterning: An example from the western Tennessee Valley. Unpublished M.A. thesis, Department of Anthropology, University of Tennessee.

Magne, Martin. 1983. Lithic and livelihood: Stone tool technologies of central southern interior B. C. Unpublished Ph.D. dissertation, Department of Anthropology, University of British Columbia, Vancouver.

Malinowski, Bronislaw. 1955. Magic, science and religion and other essays. Garden City: Doubleday.

Marquardt, William H. 1985. "Complexity and scale in the study of fisher-gatherer-hunters: An example from the Eastern United States," in Prehistoric hunter-gatherers, the emergence of cultural complexity. Edited by T. Douglas Price and James A. Brown, pp. 59-98. Orlando: Academic Press.

Marquardt, William H. amd Patty Jo Watson. 1983. "The shell mound Archaic of western Kentucky," in Archaic hunters and gatherers of the American Midwest. Edited by J. L. Phillips and J. A. Brown, pp. 323-339. New York: Academic press.

Martin, M. K. 1974. The foraging adaptation: Uniformity or diversity? Addison-Wesley Module in Anthropology 56.

Mauss, M. and H. Beuchat. 1979. Seasonal variations of the Eskimo: A study in social morphology. (Translated by J. J. Fox). London: Rutledge and Kegan Paul.

McGee, W. J. 1898. The Seri Indians of Sonora. Seventh Annual Report of the Bureau of American Ethnology, for 1895-96, part 1, pp. 1-344.

McMillan, R. Bruce and Walter E. Klippel. 1981. Post-glacial environmental change and hunting-gathering societies of the southern Prairie Peninsula. Journal of Archaeological Science 8:215-245.

McWilliam, N. D. 1936. Disposal of the dead in the Buang Mountains, Morobe District, Mandated Territory of New Guinea. Mankind. 2(2):39-42.

Meehan, Betty. 1982. Shell bed to shell midden. Canberra: Australian Institute of Aboriginal Studies.

Milanich, Jerald T. 1971. The Deptford phase: An archaeological reconstruction. Unpublished Ph. D. dissertation, Department of Anthropology, University of Florida.

Mitchell, Donald H. 1983. "Seasonal settlements, village

aggregations, and political autonomy on the central Northwest Coast," in The development of political organization in native North America. Edited by Elisabeth Tooker, pp. 97-107. 1979 proceedings of The American Ethnological Society.

Moore, David R. 1979. Islanders and aborigines at Cape York, An ethnographic reconstruction based on the 1848-1850 'Rattlesnake' journals of O. W. Brierly and information he obtained from Barbara Thompson. New Jersey: Humanities Press.

Moore, James A. 1981. "The effect of information networks in hunter-gatherer society," in Hunter-gatherer foraging strategies. Edited by Bruce Winterhalder and Eric A. Smith, pp. 194-217. Chicago: University of Chicago Press.

Morratto, Michael. 1972. A study of prehistory in the southern Sierra Nevada foothills, California. Unpublished Ph. D. dissertation. Department of Anthropology, University of Oregon.

--------. 1984. California archaeology. Orlando: Academic Press.

Morse, Dan F. 1967. The Robinson site and shell mound Archaic culture in the Middle South. Unpublished Ph. D. dissertation, Department of Anthropology, University of Michigan.

Mueller, James W. Editor. 1975. Sampling in archaeology. Tucson: University of Arizona Press.

Newmann, Holm W. 1967. The paleopathology of the Archaic Modoc Rock Shelter inhabitants. Illinois State Museum, Reports of Investigations 17.

Ogden, Peter Skene. 1933. Traits of American Indian life and characteris by a fur trader. San Francisco: The Grabhorn Press.

Orser, Charles E., Jr. 1980a. Toward a partial understanding of complexity in Arikara mortuary practice. Plains Anthropologist 25(88):113-120.

--------. 1980b. An archaeological and historical socioeconomic analysis of Arikara mortuary practice. Unpublished Ph. D. dissertation, Department of Anthropology, Southern Illinois University.

--------. 1980c. Relating James Mackay's "Indian Tribes" to archaeological manifestations of Arikara mortuary practice. South Dakota Archaeology 4:45-54.

Osborn, Alan J. 1985. Beating a dead horse: Reply to Levy's comments. American Anthropologist 87:123-125.

O'Shea, John M. 1984. Mortuary variability: An archaeological investigation. Orlando: Academic Press.

O'Shea, John M. and Marek Zvelebil. 1984. Oleneostrovski mogilnik: Reconstructing the social and economic organization of prehistoric foragers in northern Russia. Journal of Anthropological Archaeology 3:1-40.

Oswalt, Wendell H. 1973. Habitat and technology: the evolution of hunting. New York. Holt, Rinehart, and Winston.

--------.1976. An anthropological analysis of food-getting technology. New York: John Wiley and Sons.

Pader, Ellen-Jane. 1980. "Material symbolism and social relations in mortuary studies," in Anglo-Saxon cemeteries 1979. Edited by P. Rahtz, T. Dickinson, and L. Watts, pp. 143-159. B.A.R. British Series 82.

--------. 1982. Symbolism, social relations and the interpretation of mortuary remains. B.A.R. S130.

Parker, Malcolm. 1974. The Owl Creek people, a preliminary report on the Hart site, 40WM14. City of Nashville.

Parmalee, Paul W. 1959. "Aminal remains from the Modoc Rock Shelter site, Randolph County, Illinois," in Summary report of Modoc Rock Shelter. By M. L. Fowler, pp. 61-64. Illinois State Museum, Report of Investigations 8.

--------. 1962. Faunal remains from the Stanfield-Worley Bluff Shelter, Colbert County, Alabama. Journal of Alabama Archaeology 8:112-114.

Parmalee, Paul W., R. Bruce McMillan, and Frances B. King. 1976. "Changing subsistence patterns at Rodgers Shelter," in Prehistoric man and his environments: A case study in the Ozark Highland. Edited by W. Raymond Wood and R. Bruce McMillan, pp. 141-161. New York: Academic Press.

Peacock, Charles. 1954. Duck River cache. Chattanooga.

Peebles, Christopher S. 1971. "Moundville and surrounding sites: Some structural considerations of mortuary practices, II," in Approaches to the social dimensions of mortuary practices. Edited by James A. Brown, pp. 68-91. Society for American Archaeology, Memoir 25.

Peebles, Christopher S. and Susan M. 1977. Some archaeological correlates of ranked societies. American Antiquity 42:421-448.

Pelto, Pertti J. and Gretel H. Pelto. 1975. Intra-cultural diversity: Some theoretical issues. American Ethnologist 2:1-18.

Perlman, Stephen M. 1980. "An optimum diet model, coastal variability, and hunter-gatherer behavior," in Advances in Archaeological Method and Theory Volume 3. Edited by Michael B. Schiffer, pp. 257-310. New York: Academic Press.

Piggott, Stuart. 1938. The Early Bronze Age in Wessex. Proceedings of the Prehistoric Society 4:52-106.

Plog, Fred T. 1974. The study of prehistoric change. New York: Academic Press.

Powell, Mary Lucas and J. Daniel Rogers. 1980. Bioarchaeology of the McCutchan-Mclaughlin site. Oklahoma Archaeological Survey, Studies in Oklahoma's Past 5.

Price, T. Douglas. 1985. "Affluent foragers of Mesolithic southern Scandinavia," in Prehistoric hunter-gatherers, the emergence of cultural complexity. Edited by T. Douglas Price and James A. Brown, pp. 341-363. Orlando: Academic Press.

Price, T. Douglas and James A. Brown. 1985. "Aspects of hunter-gatherer complexity," in Prehistoric hunter-gatherers, the emergence of cultural complexity. Edited by T. Douglas Price and James A. Brown, pp.3-20. Orlando: Academic Press.

Quimby, George I. 1962. A year with a Chippewa family, 1763-1764. Ethnohistory 9:217-239.

Radcliffe-Brown, A. R. 1922. The Andaman Islanders. Cambridge: Cambridge University Press.

--------. 1952. Structure and function in primitive society. Glencoe: Free Press.

Ray, Verne F. 1939. Cultural relations in the Plateau of northwestern America. The Southwest Museum, Frederick Webb Hodge Anniversary Publication Fund, 3.

Reher, Charles A. Editor. 1977. Settlement and subsistence along the lower Chaco River. Albuquerque: University of New Mexico Press.

Rindos, David. 1984. The origins of agriculture: An evolutionary perspective. Orlando: Academic Press.

Ritchie, William A. 1945. An early site in Cayuga County, New York.

Researches and Transactions of the New York State Archeological Association 10(1).

Rivers, W. H. R. 1913. "The contact of peoples," in Essays and studies presented to William Ridgeway.

Robbins, Louise M. 1974. "Prehistoric people of the Mammoth Cave area," in Archaeology of the Mammoth Cave area. Edited by Patty Jo Watson, pp. 137-162. New York: Academic Press.

--------.1977. "The story of life revealed by the dead," in Biocultural adaptation in prehistoric America. Edited by Robert L. Blakely, pp. 10-26. Athens: University of Georgia Press.

Robbins, Maurice. 1968. An Archaic burial complex at Assawompsett. The Massachusetts Archaeological Society, Bronson Museum. Attleboro.

Rodriquez, W. C. and William M. Bass. 1983. Insect activity and its relationship to decay rates of human cadavers in east Tennessee. Journal of Forensic Science 28:423-432.

Rolingson, Martha Ann and Douglas W. Schwartz. 1966. Late Paleo-Indian and Early Archaic manifestations in western Kentucky. University of Kentucky Press, Studies in Anthropology 3.

Roos, Tielman. 1931. Burial customs of the !kau Bushmen. Bantu Studies 5:81-83.

Rothschild, Nan A. 1979. Mortuary behavior and social organization at Indian Knoll and Dickson Mounds. American Antiquity 44:658-675.

--------. 1983. "The recognition of leadership in egalitarian societies of the Northeast," in The development of political organization in native North America. Edited by Elisabeth Tooker, pp. 165-182. 1979 Proceedings of the American Ethnological Society.

Salmon, Merrilee H. and Wesley C. Salmon. 1979. Alternative models of scientific explanation. American Anthropologist 81:61-74.

Saxe, Arthur A. 1971. "Social dimension of mortuary practices in a Mesolithic population from Wadi Halfa, Sudan," in Approaches to the social dimensions of mortuary practices. Edited by James A. Brown, pp. 39-57. Society for American Archaeology Memoir 25.

Saxe, Arthur A. and Patricia Gall. 1977. "Ecological determinants of

mortuary practices: The Temuan of Malaysia," in Cultural-ecological perspectives on Southeast Asia. Edited by William W. Wood, pp. 74-82. Ohio University, Papers in International Southeast Asia Studies 41.

Scaglion, Richard and Richard G. Condon. 1979. Abelam Yam beliefs and socio-rhythmicity: A study in chrono-anthropology. Journal of Biosocial Science 11:17-25.

Schalk, Randall F. 1977. "The structure of an anadromous fish resource," in For theory building in archaeology. Edited by Lewis R. Binford, pp. 207-249. New York: Academic Press.

Schiffer, Michael B. 1978. "Methodological issues in ethno-archaeology," in Explorations in ethnoarchaeology. Edited by Richard A. Gould, pp. 229-247. Albuquerque: University of New Mexico Press.

--------. 1983. Toward the identification of formation processes. American Antiquity 48:675-706.

Schoolcraft, Henry R. 1855. Information respecting the history, condition, and prospects of the Indian tribes of the United States, Volume 4. Philadelphia.

Schrire, Carmel. Editor. 1984. Past and present in hunter gatherer studies. Orlando: Academic Press.

Schroedl, Gerald F. 1978. The Patrick site (40MR40), Tellico Reservoir, Tennessee. University of Tennessee, Department of Anthropology, Report of Investigations 25.

Sensenig, E. Carl and John E. Hoar. 1962. Skeletal material from the Stanfield-Worley Bluff Shelter. Journal of Alabama Archaeology 8(1 and 2):115-119.

Service, Elman R. 1971. Primitive social organization: An evolutionary perspective (second edition). New York: Random House.

Shipman, Pat, Giraud Foster, and Margaret Shoeninger. 1984. Burnt bones and teeth: An experimental study of color, morphology, crystal structure and shrinkage. Journal of Archaeological Science 11:307-325.

Silberbauer, George B. 1981. Hunter and habitat in the central Kalahari desert. Cambridge: Cambridge University Press.

Smiley, F. E., C. M. Sinopoli, H. E. Jackson, W. H. Wills, S. A.

Gregg. Editors. 1980. The archaeological correlates of hunter-gatherer societies: Studies from the ethnographic record. University of Michigan, Department of Anthropology, Michigan Discussions in Anthropology 5.

Smith, Bruce D. 1975. Middle Mississippi exploitation of animal populations. University of Michigan, Museum of Anthropology, Anthropological Papers 57.

Smith, P. E. L. 1982. "The Late Palaeolithic and Epi-Palaeolothic of northern Africa," in The Cambridge history of Africa Volume I. Edited by J. Desmond Clark, pp. 342-409. Cambridge: Cambridge University Press.

Snow, Charles E. and Erik K. Reed. 1974. "Human skeletal remains from Russell Cave," in Investigations in Russell Cave. Edited by J. W. Griffin, pp. 63-80. National Park Service, Publications in Archaeology 13.

Spencer, Sir Baldwin and F. J. Gillen. 1899. The native tribes of central Australia. London: MacMillan.

Sprague, Roderick. 1967. Aboriginal burial practices in the Plateau region of North America. Unpublished Ph. D. dissertation, Department of Anthropology, University of Arizona.

Stanislawski, Michael B. 1963. Extended burials in the prehistoric Southwest. American Antiquity 28:308-319.

Stevenson, Marc G. 1985. The formation of artifact assemblages at workshop/habitation sites: Models from Peace Point in northern Alberta. American Antiquity 50:63-81.

Steverson, Kenneth W. 1981. Middle Cumberland project. Tennessee Archaeological Society Newsletter 26(2):1-2.

Steward, Julian H. 1938. Basin-Plateau aboriginal sociopolitical groups. Bureau of American Ethnology, Bulletin 120.

Stoeckel, J. and A. K. M. A. Chowdhury. 1972. Seasonal variation in births in rural East Pakistan. Journal of Biosocial Science 4:107.

Suttles, Wayne. 1968. "Coping with abundance: Subsistence on the Northwest Coast," in Man the hunter. Edited by R. B. Lee and I. DeVore, pp. . Chicago: Aldine.

Tainter, Joseph A. 1975. Social inference and mortuary practices: an experiment in numerical classification. World Archaeology 7:1-15.

--------. 1977. "Modeling change in prehistoric social systems," in For theory building in archaeology. Edited by Lewis R. Binford, pp. 327-351. New York: Academic Press.

--------. 1978. "Mortuary practices and the study of prehistoric social systems," in Advances in archaeological method and theory, volume 1. Edited by Michael B. Schiffer, pp. 105-141. New York: Academic Press.

--------. 1980. Behavior and status in a Middle Woodland mortuary population from the Illinois Valley. American Antiquity 45:308-313.

--------. 1983. Woodland social change in the central Midwest: A review and evaluation of interpretive trends. North American Archaeologist 4:141-162.

Taylor, Walter W. 1966. "Archaic cultures adjacent to the Northeastern frontiers of Mesoamerica," in Archaeological frontiers and external connections. Edited by G. F. Ekholm and G. R. Willey, pp. 59-94. Handbook of Middle American Indians, Volume 4. Austin: University of Texas Press.

--------. 1972. The hunter-gatherer nomads of northern Mexico: A comparison of the archival and archaeological records. World Archaeology 4:167-178.

Testart, A. 1982. The significance of food storage among hunter-gatherers: Residence patterns, population densities, and social inequalities. Current Anthropology 23:523-537.

Thomas, David H. 1983. The archaeology of Monitor Valley I, epistemology. Anthropological Papers of the American Museum of Natural History 58(1).

Thomas, David H. and Clark Spencer Larson. 1979. The Anthropology of St. Catherines Island 2, the Refuge-Deptford mortuary complex. Anthropological Papers of the American Museum of Natural History 56(1).

Thomas, Elizabeth Marshall. 1958. The harmless people. New York: Vintage Books.

Thomas, Northcote W. 1908. The disposal of the dead in Australia. Folklore 19:388-408.

Thomson, Donald F. 1939. The seasonal factor in human culture. Proceedings of the Prehistoric Society 10:209-221.

Thwaites, Ruben Gold. Editor. 1925. The Jesuit relations and allied documents. New York.

Thurman, Melburn D. and L. James Willmore. 1981. A replicative cremation experiment. North American Archaeologist 2:275-283.

Todd, Lawrence C., Jr. 1983. The Horner site: Taphonomy of an early Holocene bison bonebed. Unpublished Ph. D. dissertation, Department of Anthropology, University of New Mexico.

Todd, Lawrence C., Jr. and Jack L. Hofman. 1980. An initial report on the surface collections from Long Butte #2 (48FR261): The hearths and projectile points. Wyoming Contributions to Anthorpology 2:16-57.

Todd, Lawrence C., David J. Rapson, and Eric E. Ingbar. 1985. Glimpses of organization: Integrating site structure with analysis of assemblage content. Paper presented at the 50th annual meeting of the Society for American Archaeology. Denver.

Tomak, Curtis H. 1979. Jerger: An Early Archaic mortuary site in southwestern Indiana. Proceedings of the Indiana Academy of Science 88:62-69.

--------.1983. A proposed prehistoric cultural sequence for a section of the valley of the West Fork of the White River in southwestern Indiana. Tennessee Anthropologist 8:67-94.

Toulouse, Joseph H., Jr. 1944. Cremation among the Indians of New Mexico. American Antiquity 10:64-74.

Trinkaus, K. Maurer. 1984. Mortuary ritual and mortuary remains. Current Anthropology 25:674-679.

Trubowitz, Neal. 1977. "A statistical examination of the social structure of Frontenac Island," in Current perspectives in Northeastern archaeology. Edited by R. Funk and C. Haynes, III, pp. 123-147. Research Transactions of the New York State Archaeological Association 17(1).

Tuck, James A. 1970. An Archaic Indian cemetery in Newfoundland. Scientific American 221(6).

--------. 1971. An Archaic cemetery at Port au Choix, Newfoundland. American Antiquity 36:343-358.

--------. 1976. Ancient people of Port au Choix, the excavation of an Archaic Indian cemetery in Newfoundland. Newfoundland Social and Economic Studies 17. Toronto: University of Toronto Press.

Turnbull, Colin M. 1968. "The importance of flux in two hunting

societies," in Man the hunter. Edited by R. B. Lee and I. DeVore, pp. 132-137. Chicago: Aldine.

Ubelaker, Douglas H. 1978. Human skeletal remains: Excavation, analysis, interpretation. Chicago: Aldine.

Ubelaker, Douglas H. and P. Willey. 1978. Complexity in Arikara mortuary practice. Plains Anthropologist 23:69-74.

Ucko, Peter J. 1969. Ethnography and archaeological interpretation of funerary remains. World Archaeology 1:262-280.

Van Gennep, Arnold. 1960. The rites of passage. Chicago: University of Chicago Press.

van Vark, G. N. 1974. The investigation of human cremated skeletal material by multivariate statistical methods 1. methodology. Ossa 1:63-95.

--------. 1975. The investigation of human cremated skeletal material by multivariate statistical methods, II. measures. Ossa 2:47-53.

Vehik, Susan C. 1983. Middle Woodland mortuary practices along the northeastern preiphery of the Great Plains: A consideration of Hopewellian interactions. Midcontinental Journal of Archaeology 8:211-255.

Voegelin, Erminie Wheeler. 1944. Mortuary customs of the Shawnee and other eastern Tribes. Indiana Historical Society, Prehistory Research Series 11(4).

Wagner, Mark J. 1982. "The Aaron Shelton site (40CF69): A multicomponent site in the lower Normandy Reservoir," in Eight Report of the Normandy Archaeological Project. Edited by Charles H. Faulkner and Major C. R. McCollough, pp. 389-526. University of Tennessee, Department of Anthropology, Report of Investigations 33.

Wagner, Philip L. 1960. The human use of the earth. New York: The Free Press.

Walthall, John A. 1980. Prehistoric Indians of the Southeast, archaeology of Alabama and the Middle South. University: University of Alabama Press.

Watanabe, Hitoshe. 1985. The chopper-chopping tool complex of eastern Asia: An ethnoarchaeological-ecological reexamination. Journal of Anthropological Archaeology 4:1-18.

Webb, William S. 1950a. The Carlson Annis Mound, site 5, Butler

County, Kentucky. The University of Kentucky, Reports in Anthropology 7(4).

--------. 1950b. The Read shell midden, site 10, Butler County, Kentucky. The University of Kentucky, Reports in Anthropology 7(5).

--------. 1974. Indian Knoll (second edition). Knoxville: The University of Tennessee Press.

Webb, William S. and David L. DeJarnette. 1942. An archaeological survey of Pickwick Basin in the adjacent portions of the states of Alabama, Mississippi, and Tennessee. Bureau of American Ethnology, Bulletin 129.

--------. 1948. Little Bear Creek site Ct 8, Colbert County, Alabama. Alabama Museum of Natural History, Museum Paper 26.

Webb, William S. and William G. Haag. 1947. Archaic sites in McLean County, Kentucky. University of Kentucky, Reports in Anthropology 7(1).

Weigel, Robert D., J. Alan Holman, and Andreas A. Paloumpis. 1974. "Vertebrates from Russell Cave," in Investigations in Russell Cave. By John W. Griffin pp. 81-85. National Park Service Publications in Archaeology 13.

Weiss, Kenneth M. 1973. Demographic models for anthropology. Memoirs of the Society for American Archaeology 27.

Weitzner, Bella. 1979. Notes on the Hidatsa Indians based on data recorded by the late Gilbert L. Wilson. Anthropological Papers of the American Museum of Natural History 56(2).

Wells, Calvin. 1960. A study of cremation. Antiquity 34:29-37.

Wiessner, Polly. 1982a. Beyond willow smoke and dog's tails: A comment on Binford's analysis of hunter-gatherer settlement systems. American Antiquity 47:171-177.

--------. 1982b. "Risk, reciprocity and social influences on !Kung San economics," in Politics and history in band societies. Edited by Eleanor Leacock and Richard Lee, pp. 61-84. Cambridge: Cambridge University Press.

--------. 1983. Social and ceremonial aspects of death among !Kung San. Botswana Notes and Records 15:1-5.

Williams, B. J. 1974. A model of band society. Memoirs of the Society for American Archaeology 29.

Wilmsen, Edwin N. 1974. Lindenmeier: A Pleistocene hunting society. New York: Harper and Row.

Winterhalder, Bruce and Eric A. Smith. Editors. 1981. Hunter-gatherer foraging strategies. Chicago: University of Chicago Press.

Winters, Howard D. 1968. "Value systems and trade cycles of the Late Archaic in the Midwest," in New Perspectives in Archaeology. Edited by S. R. Binford and L. R. Binford, pp. 175-221. Chicago: Aldine.

--------. 1969. The Riverton culture. Illinois State Museum, Reports of Investigations 13.

Wobst, H. Martin. 1978. The archaeo-ethnology of hunter-gatherers or the tyranny of the ethnographic record in archaeology. American Antiquity 43:303-309.

Wood, W. Raymond and Donald L. Johnson. 1978. "A survey of disturbance processes in archaeologhical site formation," in Advances in archaeological method and theory volume 1. Edited by Michael B. Schiffer, pp. 315-381. New York: Academic Press.

Woodburn, James. 1968. "Stability and flexibility in Hadza residential groupings," in Man the hunter. Edited by R. B. Lee and Irven DeVore, pp. 103-110. Chicago: Aldine.

--------. 1982. "Social dimensions of death in four African hunting and gathering societies," in Death and the regeneration of life. Edited by Maurice Bloch and Jonathan Parry, pp. 187-210. Cambridge: Cambridge University Press.

Wyckoff, Don G. and Timothy G. Baugh. 1980. Early historic Hasinai elites: A model for the material culture of governing elites. Midcontinental Journal of Archaeology 5:225-288.

Wylie, Alison. 1982. An analogy by any other name is just as analogical: A commentary on the Gould-Watson dialogue. Journal of Anthoropological Archaeology 1:382-401.

Yarrow, H. C. 1880. Introduction to the study of mortuary customs among the North American Indians. Contributions to North American Ethnology 1.

--------. 1881. A further contribution to the study of the mortuary customs of the North American Indians. First Annual Report of the Bureau of Ethnology, pp. 91-203

Yellen, John E. 1976. "Settlement patterns of the !Kung: An

archaeological perspective," in Kalahari hunter-gatherers, studies of the !Kung San and their neighbors. Edited by R. B. Lee and I. DeVore, pp.47-72. Cambridge: Harvard University Press.

--------. 1977a. "Cultural patterning in faunal remains: Evidence from the !Kung Bushman," in Experimental archaeology. Edited by D. Ingersoll, J. E. Yellen, and W. Macdonald, pp. 271-331. New York: Columbia University Press.

--------. 1977b. Archaeological approaches to the present: Models for reconstructing the past. New York: Academic Press.

Yengoyan, A. A. 1968. "Demographic and ecological influences on aboriginal Australian marriage sections," in Man the hunter. Edited by R. B. Lee and I. DeVore, pp. 185-199. Chicago: Aldine.

Yesner, David R. 1977. Resource diversity and population stability among hunter-gatherers. The Western Canadian Journal of Anthropology 7(2):18-59.

# VITA

Jack L. Hofman was born on July 23, 1954 in Anadarko, Oklahoma and was raised in Caddo County where he was graduated from Hinton High School in 1972. He attended the University of Oklahoma and received a B. A. in anthropology in 1976. During 1976 and 1977 he served as the Oklahoma State Historic Preservation Officer's staff archaeologist. He then attended graduate school at the University of Wyoming. In 1978 and 1979 he was an archaeological intern at the Illinois State Museum. In 1980 he began part-time graduate studies at The University of Tennessee-Knoxville and received an M. A. in anthropology from the latter institution in 1984. He has worked in a variety of archaeological research settings in Oklahoma, Wyoming, Illinois, and Tennessee. He was a member of The University of Tennessee's, Department of Anthropology, Columbia Archaeological Project from 1979 through 1985. He is married to Patricia A. Mansfield and they have one daughter, Jessica. He intends to pursue a career in archaeology upon receiving the Ph. D. degree.