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# THE JOE BELL SITE: SEVENTEEENTH CENTURY LIFEWAYS ON THE OCONEE RIVER

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Athens

THE JOE BELL SITE:

SEVENTEENTH CENTURY LIFEWAYS ON THE OCONEE RIVER

by

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JOHN MARK WILLIAMS
The Joe Bell Site: Seventeenth Century Lifeways on the Oconee River
(Under the direction of CHARLES HUDSON)

The Joe Bell site (9Mg28), a late Mississippian-early historic Indian village, is located at the junction of the Apalachee and Oconee Rivers in the eastern-central Piedmont of Georgia. Major archaeological excavations took place at the site in 1977 as part of the University of Georgia's work for Georgia Power Company's Lake Oconee hydroelectric facility. Material cultural evidence from the site includes floral and faunal remains, domestic and civic architecture, lithics, and ceramics. These, as well as the within village settlement pattern are all analyzed to extract as much information about past lifeways as possible. Further, the chronological position of the site is carefully established. The large quantity of ceramic vessels recovered from the site provides an opportunity to study vessel use and this is done through several computer and linguistic approaches. The results presented here on Indian lifeways may be used as a benchmark against which further studies of other Georgia and Southeastern Indian societies may be profitably compared.

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JOHN MARK WILLIAMS

Approved:

Charles Hudson Date 4 March 1983
Major Professor

Wilfred C. Bailey Date 4 March 1983
Chairman, Reading Committee

Approved:

John Dowling
Graduate Dean

March 8, 1983
Date

"Tread softly white man.
Long ere you walked here
Strange races lived, loved, and died"

--Anonymous,
Plaque at Rock Eagle Monument
Eatonton, Georgia

"It was just a little village, not large enough to be a town."

--Sonny Boy Williamson
"Little Village Blues"

## ACKNOWLEDGEMENTS

The prehistoric and early historic Native Americans of Georgia and the Southeastern United States have always fascinated me. With child-like curiosity as well as a healthy dose of imagination intact I have had the opportunity to expand my and hopefully our knowledge of their long extinct societies. Specifically, this work is about the people who once lived at the junction of the Apalachee and Oconee Rivers in north central Georgia. It is to these people and to the late Dr. Joseph Caldwell, who first excited me in what I call "scientific humanism," that this work is respectfully dedicated.

Probably more people have been involved in research on the Joe Bell site than any site in North Georgia since the 1930's. This is due to the fact that the site has, to this point, been tested and researched for over 14 years. In that time many people have worked at the site, often as volunteers. The following list of acknowledgements, while lengthy as it must be, is undoubtedly not complete. Every effort has been made to try to make it so, however. I wish to collectively and individually thank all those people because without their contributions this work would truly have been impossible.

The members of my doctoral committee helped me organize my ideas and present them in a reasonably coherent fashion. Dr. Charles Hudson served as my Major Professor and continues to teach me from his immense knowledge of Southeastern Indians. Working with him has been and I hope will continue to be both a privilege and an honor. Dr. Wilfrid Bailey served as Chairman of my Reading Committee and I thank him for his timely suggestions and comments on the manuscript. Dr. James Crawford stimulated my interest in and commented on the linguistics aspects included here. His efforts to record Indian languages that are dying and something of his fascination with them has been successfully transferred to me and I thank him for that. Dr. David Hally first taught me formal courses in the archaeology of the United States, particularly of the Southeast. He served as Principal Investigator for the work presented here and aided in making the manuscript more readable. I thank him for all of his past help and look forward to working with him in the future. Dr. Paul Fish served with Dr. Hally as Principal Investigator for the excavations at the Joe Bell site and aided in the initial proposal development for the work presented here. Thanks Paul, I really enjoyed working with you. Dr. Stephen Kowalewski aided with my final oral exams and gave the entire manuscript a thorough and extremely helpful reading and I thank him for this.

The late Joe Bell suggested the locality of 9Mg28 as that of an Indian village based upon his years of farming the area. He kindly gave permission and support to the early part of the research in 1968 and 1969. He is remembered in the name of the site and the phase, as well as a gentle friend.

Without the efforts of Marshall Woodson "Woody" Williams, my father, this project would never have been started or completed. His interest in the site and project over the years has served to inspire all associated with it, particularly myself.

A number of people were involved with the early years of work at the Joe Bell site. These include the late Dr. Joseph R. Caldwell and the late Dr. Arthur R. Kelly, both of whom worked on the site with the author and gave early support and advice. Other people involved in the 1969 work were Dr. David Hally, Woody Williams, Phil Williams, Bill Steed, Marvin Smith, Jim Rudolph, Don Smith, Jim Caldwell, and Carolyn Hunt. The Morgan County Board of Commissioners is to be thanked for the loan of a road scraper for testing of the site at that time.

Chester DePratter and Dean Wood briefly reinvestigated the site in 1974 and freely gave their information to the author. Wood also aided in the initial stages of the 1977 Project.

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Of perhaps most importance in the summer 1977 work were the crew members themselves. Paul Webb was my field assistant; and a better field worker cannot be found. Thanks, brother. The rest of the main crew consisted of Richard Bennett, Leah Chadderton, Robbie Ethridge, George Harmon, Leslie Hill, Lilly Huffman, Denise Hutto, Robin Joyner, Sam Mason, Tom Mayes, Russell McNair, Jean McPherson, and Holger Weis. Additional crew members for short periods included Jimmy Alexander, Rhonda Alexander, Delores Joyner, Bill Moon, Greg Paulk, Leslie Swann, Starr Thrasher, and Karen Walker. To all of these dedicated people I can only say thanks.

Scott McGill of McGill and Sons Incorporated directed the major earth moving operations on the site with skill and understanding. His work made ours possible. Terry Ferguson, then of the U.S. Forest Service, aided the field work in several ways. Thanks for the loan of the rocket, Terry!

The major portion of the laboratory analysis for the artifacts from 9Mg28 was performed admirably by Robbie Ethridge and Kathy Jablonski. Duane Graham, Jean James, Jeff Lord, Janice Payne, and Mark Thomas all volunteered time in 1978 and 1979 to record last minute details about the site and I thank them for this.

I wish to thank all of the people at the computer centers at the University of Georgia and Georgia Southern College for helping me produce the computer work necessary in this work. Further, Dr. Donald Graybill now of the University of Arizona, helped the computer aspects of the work with programs and advice. I also want to thank my archaeology class at Georgia Southern College in the winter of 1980, particularly Charles McPherson and Julie Barnes, for help with the computer projects.

The animal bone was identified primarily by Barbara Ruff with help from Gary Shapiro. Elizabeth Sheldon identified most of the plant remains. Leila Oertel expertly produced the drawings of the pottery vessels in Figure 37. Gisela Weis drafted most of the other illustrations. Maurie Nicora performed the chemical analysis on the deposits inside several pottery vessels. Janice Pallas and Linda Adams expertly translated my scrawl into a typed draft, a task not to be envied by anyone. All of the final draft was typed by Linda Adams, and I thank her for her talent and patience. My brother, Phil Williams, helped make the plates possible and I thank him for this and for his support through the years.

Many present and former fellow graduate students at the University of Georgia, especially Charles Pearson, Gary Shapiro, Chester DePratter, and Dan Elliott, as well as friends such as Marvin Smith are to be thanked for stimulating my thinking constantly. Long live the Lamar Institute!

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Finally I thank my parents for instilling in me the love of learning at such an early age. Without their constant support this work would never have been completed and I will forever be grateful to them.

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## CHAPTER 1

## INTRODUCTION

Most archaeologists would probably agree that there are presently three basic aims or goals in American Archaeology (Thomas 1974:3; Binford 1972:81-89). The first of these is the goal of dating cultural materials from the past and "arranging cultural units in a way which accurately reveals their generic affinities" (Binford 1972:81). This process of creating archaeologically defined culture units and tracing them through time and space has been called culture history. The second goal of archaeology is the reconstruction of past lifeways. This attempts to answer questions of how a certain group of people lived at a certain time in the past. The ideal is to describe the culture of a group of people in the past in terms ideally comparable to a modern ethnography. The final goal of archaeology is to discover cultural processes which have acted upon all humans in the past and are apt to operate in the future. Central to this goal is the question of whether there are general cultural laws about man that can be discovered using archaeology's long perspective. Archaeologists are, for example, in a much better position than social anthropologists to study the processes of long-term culture change because of the nature of their data base.

Practically all other research done by archaeologists which does not deal with substantive data about the past is concerned in one way or another with technique. Studies of technique include research on refining ways of pursuing the goals outlined above. Means of dating materials, sampling schemes, floral, faunal, and pollen analyses are all techniques. The identification of patterns contained within archaeological sites, whether done through intuitive, visual, or computer approaches, is technique. The act of creating analogs for use through the procedure of ethnoarchaeology (White 1977:100) or experimental archaeology is technique. The identification and analysis of the processes acting on the archaeological record is technique (Shiffer 1976). All of these are directly or indirectly involved in providing aids to deal with the three major goals outlined above.

Before describing the research to be proposed, it will be useful to get an historical perspective on the relative importance of these three goals during the last 100 years. In order to simplify this discussion the goals will subsequently be referred to as: (1) culture history; (2) lifeways; and (3) process.

Although much late 19th century research was concerned with the now dead questions of the origin of the "Mound Builders," a general interest in the lifeways question was prevalent. The writings of C. C. Jones (1873) show an early interest in the use of archaeological materials to elucidate the lifeways of the Indians. In fact, the goal of lifeway reconstruction has always been the main area of public interest. How did the Indians live? By the 1930's, as archaeologists began to realize the great time depth in many archaeological sites, professional interest changed to the culture history goal of identifying consistent archaeological assemblages, dating them with respect to one another, and speculating on their origins and dispersal. In the

Eastern U. S. the McKern system made these ideas and goals into a concrete reality (McKern 1939). Interest in lifeways as a goal took a back seat to this "real archaeology." Some researchers in the Southeast, such as Lewis and Kneberg (1946, 1958), continued attempting to reconstruct lifeways, but many archaeologists came to feel that perhaps the study of lifeways was nothing but useless speculation.

In the 1960's two new trends developed. Following Binford's 1962 lead, a number of archaeologists began asking questions of whether or not we may in fact, with new and better techniques, be able to actually study some aspects of the lifeways of the prehistoric inhabitants of a site. That aspects of social organization or even belief system could be recovered was at that time a very new idea to the profession. These "new archaeologists" quickly lost interest in the goal of culture history and began dealing with many aspects of lifeways, using a host of new techniques.

By the late 1960's, however, the goal of reconstructing parts of the lifeways of past peoples began losing ground to research oriented toward the third major goal--that of discovering and explaining cultural processes. Indeed, unless one proclaimed oneself to be a "processual archaeologist" one ran the risk of being considered inadequate or old fashioned (Walker 1974). The goal of discovering and explaining cultural processes--how cultures work or change and how people adapt to their environment--was elevated as the primary goal, superseding the others. A rash of hastily written books expressing this view (such as Watson, LeBlanc, and Redman: 1971) were published, but they were often poorly organized and polemic. However southeastern archaeologists who have attempted to work with culture processes have had few successes and it is now clear that to take the view that the third goal can be accomplished without dealing with the other two is a poorly founded idea.

The research presented here has as its goal the reconstruction of the lifeways of a particular group of people who lived on the Oconee River in north central Georgia. To a lesser extent it will address itself to their culture history also. No initial hypotheses about general human cultural processes will be proposed or tested. I use "lifeways" to mean the sum total of the way people carry out their daily lives. "Lifeways" has some of the meaning of the overworked term "culture," but it has the advantage of focusing on day-to-day matters, the simpler aspects of a total culture. Probably the biggest attraction of the term is that it helps avoid the ambiguity of the term "culture," which both refers to how people think and act, and also refers to a specific group of people.

In attempting to deal with a reconstruction of the lifeways at site 9Mg28, however, an immediate problem presents itself. While there have been a large number of studies which attempt to study specific aspects of the lifeways of the people at a particular site, such as the people's adaptation to the physical environment, the demonstration of matrilineality, or the presence of social stratification, there have been few archaeological studies which attempt to study <u>all</u> parts of the lifeways of a group of people at one time. There are at least three reasons for this. First, the large mass of archaeological material and notes produced by the excavation of even a moderately large site can rapidly exceed what one person can manage in a moderate length of time. Unless one is willing to devote an entire lifetime to a huge site, the goal of a moderately complete lifeway reconstruction becomes untenable. Large team efforts are obviously appropriate. Fortunately the site I am concerned with is a fairly small village site, so I thereby avoid this problem. Secondly, many archaeological projects have not included overall lifeway reconstruction as having high priority; this is to some degree a matter of individual choice. The third impediment, and the most critical one, is what I perceive as the lack of a generally acceptable model with which one might attempt such research.

A number of possible approaches through which lifeways could be studied do suggest themselves, however. The first, and perhaps the simplest is an intuitively organized narrative of the lifeways at a particular place. For those writers with narrative ability and a good grasp of ethnographic methods, this approach could suffice. Unfortunately it depends too much on the subjective ability of the writer to be of general utility, and whether it could yield comparable results from different sites is open to serious questions. One way this technique might be augmented in terms of explicitness and replicability would be to use a guide such as Notes and Queries on Anthropology (Seligman 1951), or George P. Murdock's, "Outline of Cultural Materials" (Murdock et al. 1950). These guide books provide outlines of topics or subjects related to the study of man which have been generally accepted by ethnographers as essential to a complete description of the lifeways of any human group. Unfortunately these guides tend to be rather encyclopedic, lacking any theoretically coherent organizational scheme. They are, however, useful as check lists.

Of greater use as an organizing scheme is the widely used approach which breaks culture into three analytical units: the relationships of man to the environment (economics), man to man (social organization), and man to the supernatural (religion). These three divisions interact with one another in a systematic manner to produce the total culture. This view of culture was an outgrowth of research in the 1920's through the 1940's under the name "functionalism." Functionalism emphasized relationships as opposed to individual parts of culture.

In an attempt to show how archaeological materials may be related to this tripartite view of culture, Lewis Binford (1962) has suggested a classification of artifacts into three comparable divisions. "Technomic" artifacts are those which have "their primary functional context in coping directly with the physical environment" (ibid: 219). "Sociotechnic" artifacts have "their primary functional context in social subsystems of the total cultural system" (ibid: 219). Finally, "ideotechnic" artifacts "have their primary functional context in the ideological component of the social system" (ibid: 219). These three terms represent one of the first explicit attempts to relate archaeologically recovered materials to culture in a systematic manner. Binford's ideas, however, build largely on the work of Walter Taylor (1948). Taylor's prescription for dealing with archaeological materials in terms of cultural anthropology are organized under what he called the "conjunctive approach." Taylor himself never wrote a monograph utilizing this approach, and no one else has seen fit to use it as a strict outline. His approach includes much that is simply technique, and his theoretical framework is not altogether clear.

An anthropologist who had much input to the thinking of Taylor was Ralph Linton, particularly in his 1936 book The Study of Man. In fact, upon reading the relevant portions of this text, it appears to me that his theoretical approach to culture in conjunction with the many new techniques available to archaeologists can form a useful outline for dealing with the reconstruction of past lifeways. The value of Linton's outline for analyzing culture stems from its being relatively complete yet simple. I am here proposing to use much of Linton's conception of culture as a guide to aid in the analysis of lifeways at site 9Mg28.

While Linton's primary professional interest were in the field of cultural anthropology, his early work was in archaeology. He regarded his 1936 publication The Study of Man as his magnum opus (Gillin 1954: 276). In it he presents, among other things, some of the ideas about culture used in this present work. In this book Linton exhibited two of his greatest talents as a writer. First, as John Gillin states, "Ralph Linton possessed an unusual quality (among Anthropologists, at least) of being able to express his ideas in pure and simple English" (ibid: 277). This is something that neither Walter Taylor nor Lewis Binford accomplished, and this in itself makes Linton a more accessible if not a better source than either Taylor or Binford. Secondly, again according to Gillin, his "greatest forte consisted in his ability to synthesize current ideas and thereby to originate new ones" (ibid: 277). In The Study of Man he "provides a reconciliation of functionalism with a historical approach to culture" (Linton and Wagley 1971:41). He "brought history into a functional approach and provided concepts which appreciably sharpened functional analysis" (ibid:43).

In order to be able to understand the culture of any group of humans it is necessary to analyze that culture in small and thus manageable units. The analytical unit called the culture trait was in wide use by American anthropologists in the 1920's and 1930's. Historical particularists identified traits and traced their historical and geographical distribution, trying to distinguish diffusion from invention and their effects on culture change. They had, however, a poor grasp of how a culture operated at any given point in time. British Functionalism studied the relationships between parts of a society in attempting to understand how the parts fit together as a complete system. They were relatively unconcerned with culture change and were uninterested in material culture. Linton's rapprochment between these two theoretical views of the study of culture was predicated on his belief that both were correct so far as they went, but that each was insufficient by itself to adequately describe a culture. He began by defining a set of four terms, each of increasing complexity, which provide a "purely objective classification of culture elements which can be used as an aid to analytical studies" (Linton 1936:397). This was merely the first step in his task which he saw as "the development of some new convention by which the total content of a culture and the interrelations of the elements within this content can be shown simultaneously" (ibid: 397). The four classificatory units he defined were: (1) the item, (2) the trait, (3) the trait complex, and (4) the activity. A trait is defined as an individual act or object which represents an overt expression of a culture. Traits can be analyzed into their component parts or units which are called items. Linton gives the example of a bow as a trait which can be divided into such items as the wood, string, etc. Traits are "intimately associated with some other trait or traits to form a large functional unit" (ibid: 397) which he calls the trait complex. Trait complexes are combined to form an activity. Finally, all activities taken together describe the culture. He points out that his division into four steps in an obviously arbitrary but quite useful selection. Also, any item from a lower level may be present in two or more upper level units.

In order to understand how these units fit together in a given culture, Linton hit upon a novel idea which is one of the most original contributions of his study. This involves the identification of four separate characteristics that all of the above classificatory units have in common. These are form, use, meaning, and function. With these concepts Linton believed that a rational synthesis of the above analytical units could be achieved. This problem of synthesis has caused archaeology much grief since the late 1930's.

Briefly, many archaeologists who followed the McKern system of archaeological research (McKern 1939) mistakenly believed that a simple listing of traits for a given archaeological culture in some way defined or explained that culture. They believed that a trait list was a reasonable synthesis of analytical units. It is not. Much of "new archaeology" was a revolt against this idea, although it was usually not phrased in these terms. But, for many "new archaeologists," unfortunately, the very idea of traits was also rejected categorically. The use of traits defined as analytical units is not a bad idea. Indeed, it is almost impossible to work without some such concept. What is needed is a technique of synthesis which is more anthropologically oriented than trait listing. Linton's concepts, available when the McKern system was implemented, can provide this synthesis.

As mentioned above, every trait, trait complex, etc. usually has four attributes: form, use, meaning, and function. Form is "the sum and arrangement of its component behavior patterns; in other words, that aspect of the complex whose expressions can be observed directly and which can, therefore, be transmitted from one society to another" (Linton 1936:403). In terms of an artifact or structure this includes what the end product looks like as well as the steps and techniques of manufacture. With respect to archaeology, this equates with the description of artifacts, features, and patterns observed in the preserved record. It would be safe to say that most archaeological research in the Southeast--or for that matter in most of America--has only dealt with form.

The second trait attribute is use. Linton says "The use of any culture element is an expression of its relation to things external to the social-cultural configuration" (ibid:404). This is most clearly seen with respect to material culture. An axe, for instance, is a cultural item used for chopping trees, firewood, and so on, all of which are external to the social system. Actually, the common sense notion of use suffices. A knife is used for cutting; a hoe is used for digging. It should be pointed out that most archaeologists are presently using the terms use and function interchangeably, with a decided preference for the latter. Linton's concept of use is what most archaeologists' mean when they use the term function. "Function," as a term, is reserved by Linton for another concept to be discussed shortly. The concept of use is much easier to apply to material items than to non-material aspects of a culture, although it can be applied in many cases.

It should be pointed out that any one form may, and often does, have multiple uses and, conversely, several different forms may have the same use. An example of the first would be that a hammer might be used for driving nails or cracking pecans. An example of the converse is the use of several different vessel forms to fetch water. There is a limit, of course, to the uses for any given form. Again to quote Linton, "Those expressions of culture which have material form, for example, tools, utensils, and ornaments, possess certain physical qualities which have a limiting effect upon the uses which can be assigned to them" (ibid: 407). The degree of multiple uses for forms, of course, is directly related to whether the form in question is that of an item, trait, trait complex, or activity, to use Linton's terms. An item may have very many uses; a trait complex may have a few uses; and an activity may have only one use.

The third major attribute of cultural units is <u>meaning</u>. "The meaning of a trait complex [for example] consists of the associations which any society attaches to it. Such associations are subjective and frequently unconscious. They find only indirect expression in behavior and therefore cannot be established by purely objective methods" (ibid: 403-404). Meanings are nonmaterial characteristics of a trait complex, for example, that exist only in the minds of the humans who possess that trait complex. What, for instance, is the <u>meaning</u> of a particular symbol? The number of possible meanings that can be attached to a given activity or trait complex is almost limitless. One culture may have several meanings for any particular trait complex. In addition, many different cultures may have different meanings for trait complexes with very similar forms. Linton discusses the many different meanings attached to the Sun Dance by various Plains Indian tribes. This points out that form and use, as the most obvious and transmittable characteristics of a trait complex are more apt to be transferred intact than is something as variable as meaning. New meanings may be given to borrowed elements by a culture. Meanings may be absent for items or even traits because they may be but integral parts of a larger trait, trait complex, or activity in which meaning may be attached to the whole but not separately to the individual parts. Of course, three or four trait complexes with separate and specific meanings may be a part of an activity which has a total meaning of its own. It is virtually impossible to recover meaning from archaeological data alone. With reference to ethnohistoric or analogical sources, however, suggested meanings can be supplied to better explain archaeologically recovered information.

It remains for function to be discussed. "The function of a trait complex [for example] is the sum total of its contribution toward the perpetuation of the social-cultural cofiguration" (ibid: 404). Function is a dynamic concept which expresses how a given trait complex, activity, etc. fits into the overall social system. This use of the word is fairly close to that of the "functionalists" in the 1920's through the 1940's. Function derives "least from form, somewhat more from use, but most from meaning" (ibid: 410). In contrast to most early functionalist researchers, Linton did not bind himself with a purely synchronic perspective. "It is not unusual for trait complexes to change their functional emphasis in the course of this history.... Trait complexes may even, with the passage of time, lose certain functions entirely and acquire other and quite different ones" (ibid: 418-419).

Linton's approach, delineating form, use, meaning, and function for items, traits, trait complexes, and activities provided a way through which the work of historical particularists (who studied form and occasionally use and change in these through space and time) and functionalists (who studied the functional relationships at one time only) could be brought together. Neither of these views alone is adequate for completely describing or explaining a culture in both diachronic and synchronic perspectives. Through the use of Linton's outline both material and non-material lifeways as they exist at any one time may be viewed and changes in them through time and space may be outlined and their significance assessed.

In summary, Linton's concept of the attributes of a trait complex, for instance, may be viewed in the form of the following manner.

Form and meaning are passive or atemporal qualities. They are attributes that simply exist; no action is directly involved other than production of a given form. Use and function are active or dynamic attributes which entail some kind of action, usually in a fixed temporal setting. Form and use are objective in that direct observation is usually sufficient to identify these ethnographically. Finally, meaning and function are more subjective in that these attributes are more "internal" and may be more difficult to obtain ethnographically.

Earlier, Binford's concepts for analyzing archaeologically recovered artifacts were discussed. These three, technomic, sociotechnic, and ideotechnic, may be fairly easily subsumed into Linton's outline. All artifacts have form. In addition they all have a certain use, meaning and function. Technomic artifacts (Binford's term) are those in which use is emphasized with respect to meaning and function. Sociotechnic artifacts (again Binford's term) are those in which function is the emphasized member of the use, meaning, function trio. Finally, ideotechnic artifacts (again Binford) are those that emphasize meaning rather than use or function.

In attempting to use Linton's model to aid reconstruction of past lifeways a number of points should be made. First, I do not hold this outline to be a fixed entity which cannot be questioned or modified as necessary. I am not trying to test the usefulness of Linton's ideas in this research directly. The main goal is still to reconstruct the lifeways at site 9Mg28. If the model should prove useful, that will be well and good, but it is not on trial as such. I believe, simply, that Linton's ideas form the most complete theoretical model for lifeway reconstruction presently available. It forces one to ask questions which may not have been obvious, such as what is the meaning of a particular burial style. The answers may not be simple or even answerable, but consideration of the question is important in my overall goal. Meaning and function, of course, can not be directly discovered from archaeological data, but may often be explained with reference to analogical source material. It should be pointed out that a few archaeologists have attempted using Linton's ideas (Fontana 1962; Grange 1971) although their leads have been not widely known or adopted by others.

Second, Linton's early professioal background as an archaeologist should be kept in mind when considering his scheme of interpretation. Being intimately familiar with archaeological data, it is probable that his scheme was at least partially developed with archaeological considerations in mind. Further, his intense interest in material culture can be taken as having been instrumental in the development of this model. This is not to say that his views are not appropriate for non-material aspects of culture. They certainly are. But material culture is also amenable to such analysis.

Linton intended his concepts of form, use, meaning and function to be primarily used with reference to the trait complexes and activities. This is not to say, however, that they should not be applied to items or traits, but that for these the attributes of meaning, function, or use may not be readily apparent or even present. They may be present and important, however. The meanings or functions of designs on vessels, for example, may be quite significant. I, therefore, am not eliminating any artifacts (items or traits) from consideration using his system.

It should be noted that while Linton's approach to the study of lifeways is systematic. It is not nearly so complete as the General Systems Theory originally outlined by Ludwig von Bertalanffy (Bertalanffy 1969). Bertalanffy's ideas have formed the basis of much archaeological work done in this country in recent years. While I am not opposed to Bertalanffy's ideas, I find Linton's systematic approach more easily utilized and directly compatible with the study of lifeways based on archaeological materials. In point of fact the primary use of Linton's ideas in this work will involve the form and use categories, although meanings and functions will be occasionally examined.

## CHAPTER 2

## ENVIRONMENTAL SETTING

A common dictionary definition of "setting" is the "actual physical surroundings of a place." The purpose of this chapter is to review and describe the physical surroundings of the Joe Bell site. This is done to better understand the given or external conditions under which the culture represented by the occupation at 9Mg28 existed. There is no doubt that every culture has a critical and specific interaction with its environment, although such interaction is not a one way street. Neither culture nor environment completely shapes the other, but an appreciation of their interaction is critical to understanding life-ways among the people who once lived at the site in question.

There is no general agreement about what the remote boundaries of a given environment should be drawn. Certainly different lines or boundaries can be and are drawn, dependent on different attributes of environments. While there is a general correspondence between many plant and animal communities with each other, and with the abiotic components of their environment, the correlation is almost never exact.

With this in mind it must be stated that there are no completely clear-cut ecological boundaries through which the environment of the Joe Bell site may be delimited. It has become traditional, however, to place emphasis on environmental areas limited or defined by the nature of the geological history of an area. This procedure will be followed in this research with the caveat that three different areas will be outlined, each a smaller subdivision of the former. The largest of these includes all of what is commonly called the Piedmont region of the state of Georgia (Figure 1). The second includes the area of the entire Wallace Reservoir and its immediate surrounding along the Oconee River. The final area is restricted to the area in the immediate vicinity (one or two miles) of site 9Mg28.

The remainder of this chapter describes and discusses these three environmental areas with respect to their geological, climatic, physiographic, hydrological, floral, and faunal characteristics. There is much redundancy in these characteristics from one environmental area to another since each is a subdivision of the former. Some characteristics described for one will not be repeated for another.

An analysis of the geology of the region forms a figurative as well as a literal base for further studies and thus is a logical beginning point. The Georgia Piedmont is a 110 mile wide northeast-southwest trending belt in the northern portion of the state. It is broadly characterized as an area of moderately to highly weathered igneous and metamorphosed igneous rocks of substantial age. Hurst says that all are at least 250 million years old (1970:393). The Piedmont is bordered on its southern edge by the Coastal Plain, which uniformly commences at the fall line. The Coastal Plain consists of thick layers of sedimentary rocks formed more recently than the Piedmont. The Coastal Plain is relatively flat, although some areas have moderate relief due to erosion.

The northwest portion of the state contains other sedimentary deposits bordering the Piedmont, while the Appalachian Mountains border the northeast part of the Georgia Piedmont. The Piedmont itself

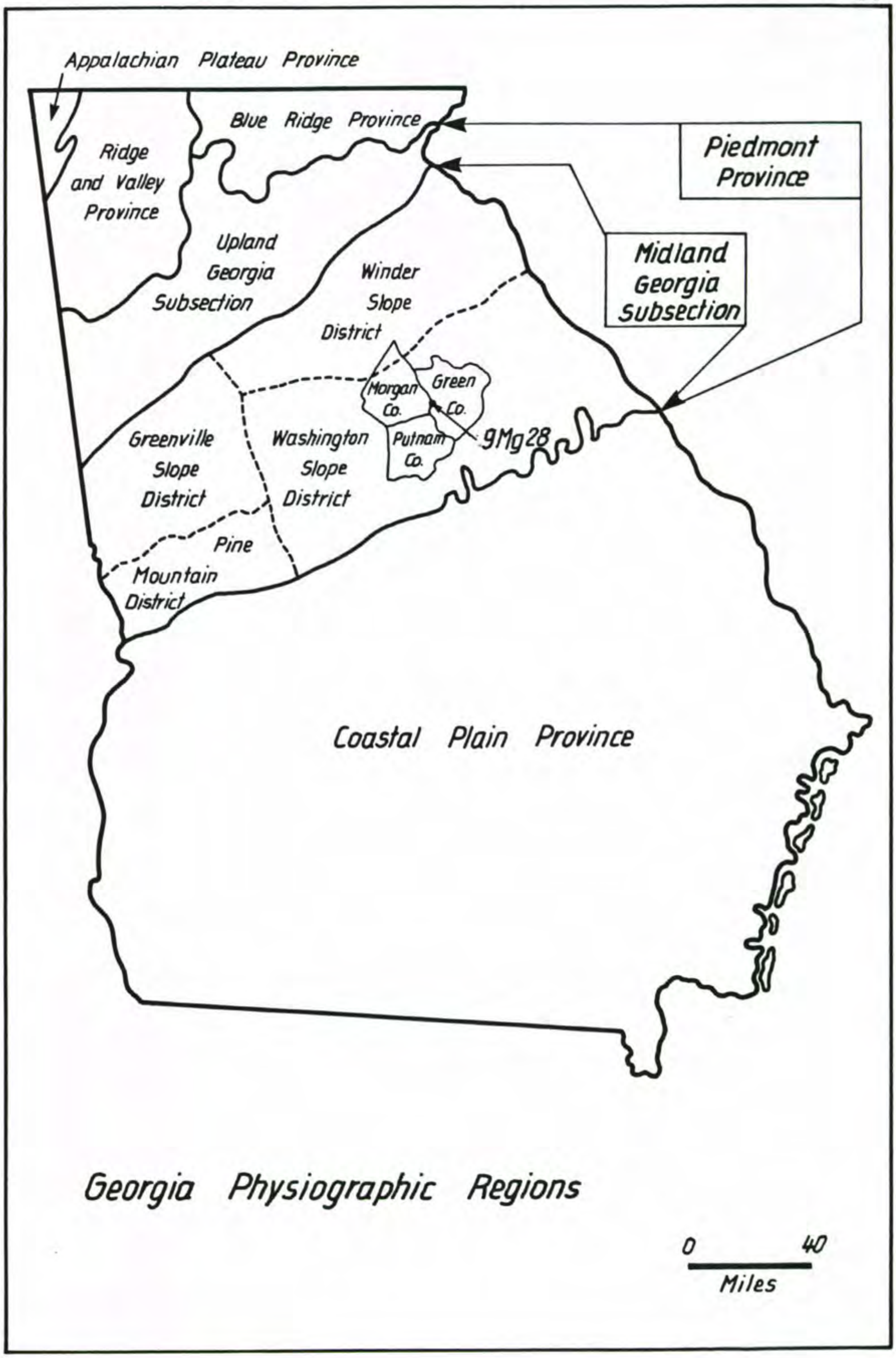

Appalachian Plateau Province
Blue Ridge Province
Ridge and Valley Province
Piedmont Province
Upland Georgia Subsection
Midland Georgia Subsection
Winder Slope District
Morgan Co.
Green Co.
Putnam Co.
9Mg28
Greenville Slope District
Washington Slope District
Pine Mountain District
Coastal Plain Province
Georgia Physiographic Regions
0
40
Miles

Figure 1

continues on into South Carolina and Alabama to the east and west respectively.

The Piedmont consists of a large number of igneous and metamorphic rock belts all trending in a northeast-southwest direction. A number of inactive fault lines separate the various belts (Hurst 1970). Some deposits of igneous rocks such as granite are commercially valuable resources in the area. The majority of the rocks, however, are metamorphasized into gneisses, quartzite, and other forms. Most are highly weathered, and the typical Georgia red clays are by products of this erosion. Almost all of the Piedmont has these red soils as a basic soil component.

Clark and Zisa (1976) divide the entire Georgia Piedmont into nine different physiographic districts. These are divided between two major subdivisions of the Piedmont, the Upland Georgia Subsection and the Midland Georgia Subsection. The Midland Georgia Subsection is the larger of the two and occupies over 70% of the Piedmont. The four districts in the Midland section are the Winder Slope District, the Greenville Slope District, the Pine Mountain District and, the Washington Slope District. The Wallace Reservoir is located near the center of the Washington Slope District.

All the rivers in the Washington Slope District flow to the Atlantic Ocean. All of the four districts except the Pine Mountain one have rolling or gently undulating surfaces. Within the Washington Slope District the local relief is 50 to 100 feet maximum. Streams are generally in broad, shallow valleys, although variations exist. Divides between streams are usually broad and rounded (Clark and Zisa 1976).

The Washington Slope District, in which the Joe Bell site is situated, has the least relief of any of the Piedmont zones. As one moves to the north, relief increases by zone until the Appalachian Mountains are suddenly encountered. The Wallace Reservoir (now Lake Oconee) is located in the very center of the Washington Slope District along the Oconee River. The Oconee rises in the Upland Piedmont at the border of the Winder Slope District and the Gainesville Ridges District some 50 miles above the head of the lake (Figure 2). The dam, a Georgia Power Company hydroelectric facility, is located just above the head of Lake Sinclair at a point some 20 miles above the fall line at Milledgeville (30 miles by the river itself). The lake extends some 25 air miles up the Oconee and its intervening tributaries (Figure 3).

The major flooded tributaries are the Apalachee River and Richland Creek. The only other drowned creeks of any size are Lick Creek and Sugar Creek, both on the right bank of the Oconee between the Apalachee and the dam.

The topography of most of the Piedmont in the vicinity of the reservoir is typical of that of the Washington Slope District - the Oconee is in a broad rounded valley for most of the reservoir length. The lower portion of the reservoir is somewhat atypical, however, as the river crosses the surface exposure of the Siloam granitic pluton. The rocks exposed in this area cause the river to become quite sinuous within a narrow floodplain planted by steep valley sides. The contrast between the broad upper part of the valley and the narrow lower part is quite striking and must have been recognized by the former Indian occupants of the Valley.

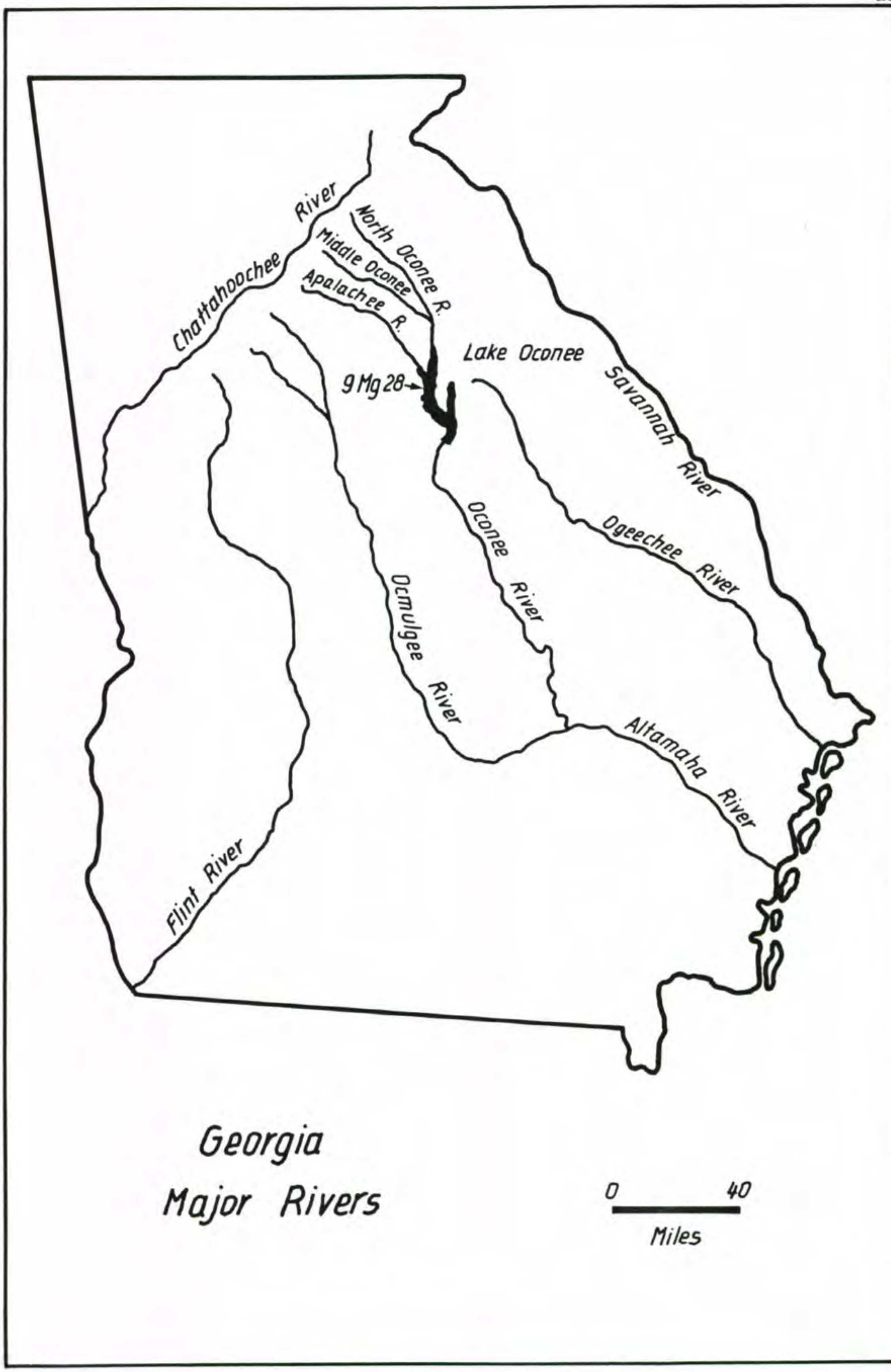

Chattahoochee River
North Oconee R.
Middle Oconee
Apalachee R.
Lake Oconee
9 Mg 28
Savannah River
Oconee River
Ogeechee River
Ocmulgee River
Altamaha River
Flint River
Georgia
Major Rivers
0
40
Miles

Figure 2

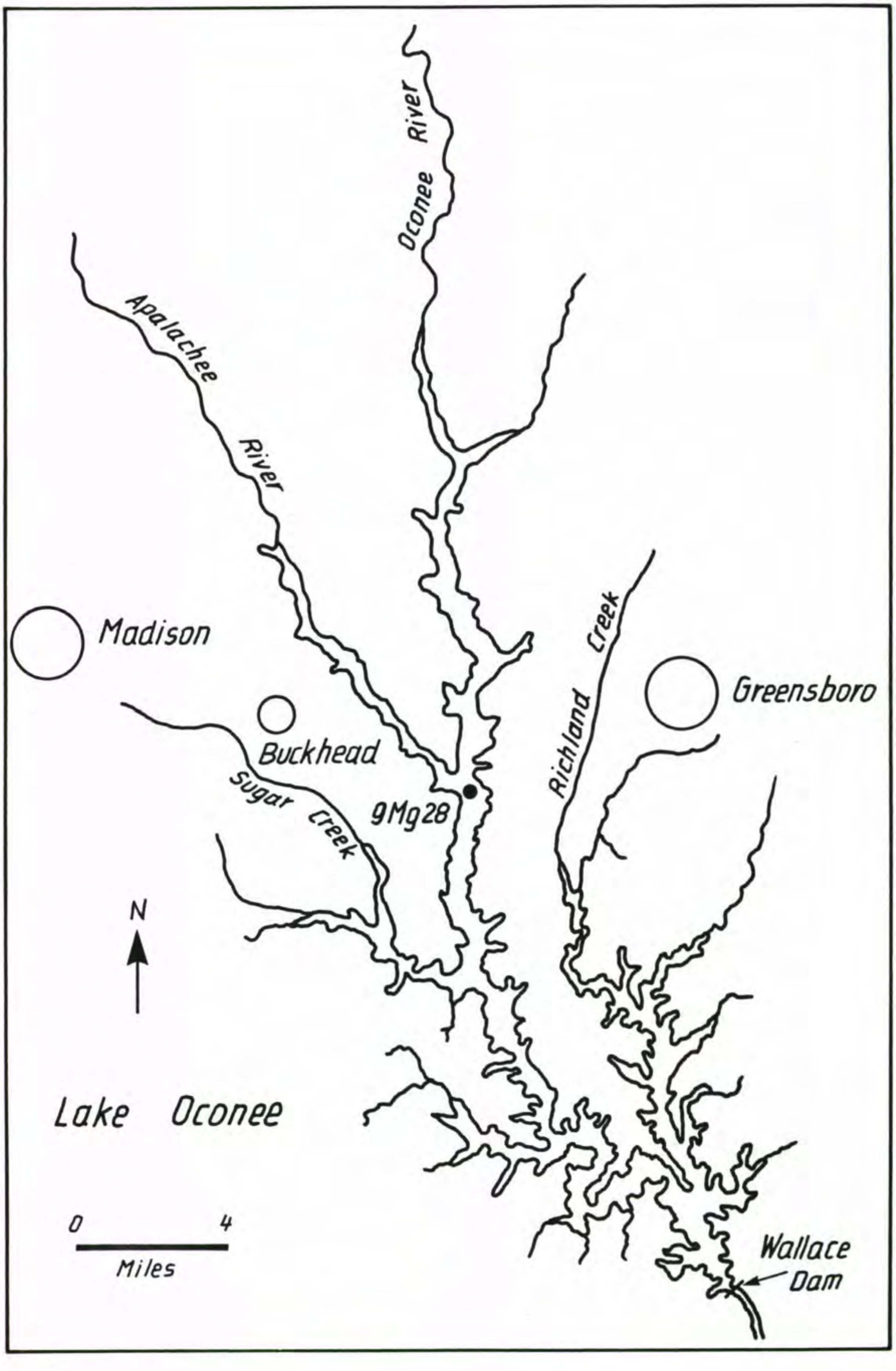

Oconee River
Apalachee River
Madison
Buckhead
Greensboro
Richland Creek
Sugar Creek
9Mg28
N
Lake Oconee
0
4
Miles
Wallace Dam

Figure 3

The Joe Bell site is located just south of the mouth of the Apalachee River on the west bank of the Oconee River. The actual location is on a small knoll overlooking the junction some 500 feet from either of the two rivers (Figure 4). The knoll upon which the site is situated is an erosional remnant with a core of metamorphosed granite. The granite is exposed at one point near the crest of the hill just beyond the excavated area of the site. Site elevation is 435 feet above mean sea level - only three to four feet below normal pool level in the reservoir. When water is low in the reservoir in late summer and fall the site is often exposed. A small wet weather stream is just to the west and forms the extreme west edge of the site. The location is ideal to view both rivers and avoid most floods.

The following information describes the physiographic setting of the Joe Bell site and its immediate vicinity in terms of what the people living there would have known. The Oconee River was 210 feet wide at 9Mg28 prior to the creation of Lake Oconee. Below its junction with the Apalachee the river travels southeastward for one mile, curves sharply to the southwest for about 1/2 mile, then gently curves back toward the south. North of the junction with the Apalachee it heads northwest for 1/2 mile, turns tightly to the northeast and east for 1/2 mile, then curves back to the north and northwest up to the two mile mark. The Apalachee River joins the Oconee at an unusual angle, apparently due to the presence of the large rock outcrop upon which 9Mg28 rests. This granite rock, revealed by railroad construction activities at the site in 1977, comes to the surface on the edge of the site. It must represent a small pluton that is in the middle of the flood plain. The Apalachee courses toward the junction from the

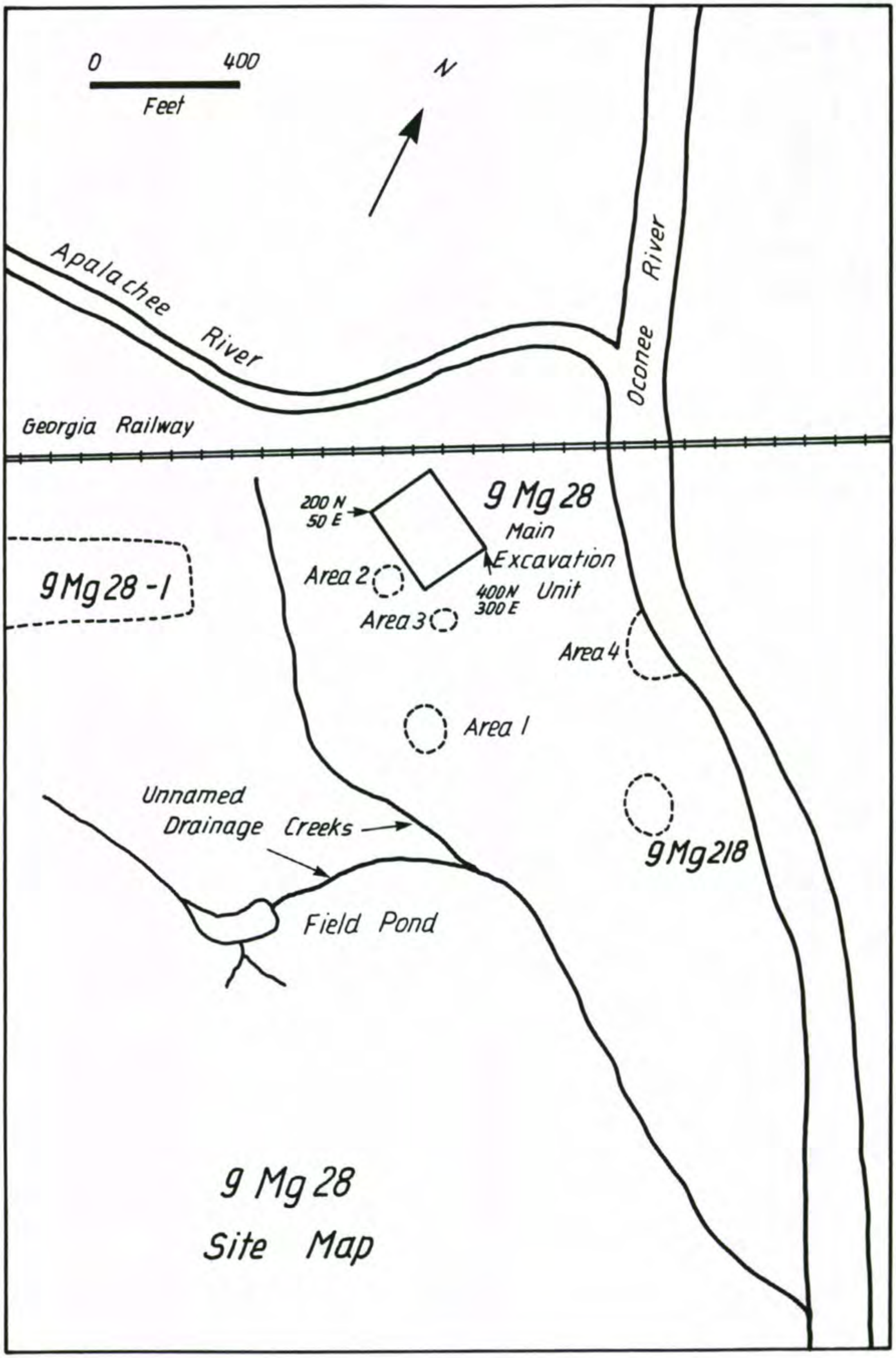

0
400
Feet
N
Apalachee
River
Oconee
River
Georgia Railway
9 Mg 28
Main
Excavation
Unit
200 N
50 E
400N
300 E
Area 2
Area 3
9 Mg 28 -1
Area 4
Area 1
9 Mg 218
Unnamed
Drainage Creeks
Field Pond
9 Mg 28
Site Map

Figure 4

northwest and is fairly straight for the last two miles. About 1/2 mile upstream, however, it shifts first to the east and finally to the northeast just before it enters the Oconee. If no rock outcrop existed the Apalachee probably would have joined at the normal southeast direction rather than swinging back to the northeast. West and southwest of 9Mg28 is a low swale that probably was the location of the Apalachee at one time. Its mouth was probably some 1/2 mile south of the present location. There is no evidence, however, that it or the Oconee has occupied other than their present positions since people have lived in the vicinity. A total of five active streams enter the Oconee's East bank within two miles of 9Mg28 while three small streams (other than the Apalachee) enter from the west bank in the same distance. The Apalachee itself has two streams on its northeast bank and three streams on its southwest bank again within two miles of the site. That the vicinity is well drained and supplied with water is thus obvious.

9Mg28 is situated at the head of a 1000 acre bottom land which bounds the west bank of the Oconee. Close to twenty archaeological sites have been found in this bottom land. The land rises rapidly and steadily to the southwest out of the river bottom reaching elevations of 600 feet at a distance of two miles. These are the only uplands available to the people at 9Mg28 without crossing the river. Across the Oconee, however, uplands come much closer to the bank and the bottom lands on that side are less than half of the size of those on the west bank. Between the Apalachee and Oconee Rivers, the land rises gradually and slowly and reaches an elevation of only 540 feet at the two mile mark. Uplands also are present in the northeast direction at

1/2 to 2 miles distance. These hills are separated from those to the southeast of the site by a large unnamed stream that enters the Oconee just above and on the opposite side of the river from the Apalachee River. Additional bottom land is present in two tight bends of the Oconee 1/2 to 1 1/2 miles north of 9Mg28. Smaller bottom lands also extend for a short distance up the Apalachee River, mostly on its northeast bank, and on the east bank of the Oconee one to two miles south of the site.

Climatic information is of course, not available for the specific area around 9Mg28, but it is available for Morgan County as a whole. This information also can be taken as typical of the Georgia Piedmont. As with any location, the climate of the Piedmont is determined by the latitude, prevailing winds, proximity of large bodies of waters, and locations of mountains as barriers to wind. The following climatic data is primarily derived from the work of Carter (1965).

The average yearly rainfall is 47.5 inches for Morgan County, although it may vary from 36 to 60. The spring of the year is the wettest and the fall the driest. Summer and winter are about equal in rainfall. Winter and spring precipitation is caused by the combining of cold air from the northwest with warm moist air from the south. Summer rain is more from local storms, and these are much more geographically isolated than the broad area precipitation of winter and early spring. The localized summer rains are often quite intense. Thunderstorms occur on as many as 50 days a year, generally in the middle to late summer and early fall. Snow is rare in winter - generally there are no more than one or two light deposits a year. In some years no snow or ice falls at all. The average humidity is quite high. It is usually higher in the morning (80 to 90 percent), while by the early afternoon it generally drops (50 percent or so). Average windspeed is seven to eleven miles per hour, the highest being in late winter and early spring and the lowest in midsummer (Carter 1965).

Temperature varies greatly through the year, the summers are warm to hot while the winters are only moderately cold and are highly variable. Warm periods occur at intervals during the winter with some regularity. The first freeze of the winter is usually in early to mid November but can be as late as late as the end of November or as early as mid-October. The last winter freeze is usually in mid-to-late March but has varied from late February to late April. An average of 225 frost free days occur through the growing season. Although all four seasons are present and distinct, the fall and spring seasons are quite brief compared to summer and winter. The winter has an average of only 50 days of freezing weather interspersed with warmer days. Daytime winter highs are almost always above freezing. Temperatures of less than 20 degrees Fahrenheit occur only about five days a year (Carter 1965).

Summer temperatures reach 90 degrees or higher on 60 percent of the days in June, July, and August. Temperatures of over 100 degrees occur on only about two days a year, however. Summer night time temperatures do not commonly drop below 70 degrees (Carter 1965). There is no evidence to indicate that the climate at the time period of the major occupation of the site was any different from the present.

The soils in the vicinity of 9Mg28 are of two basic types - alluvial and upland. There are five types of alluvial soil and four upland soils that constitute most of the soils within two miles of the site (U.S.D.A. 1965). The alluvial soils will be discussed first, then those of the uplands.

The alluvial soils of course are derived from upstream erosion of upland soils with subsequent redeposition due to the action of water. These are generally classified by the age of the deposits and their degree of permeability, among other factors. There are some deposits of undefined alluvium in the area but these are quite recent. Of the alluvial soils which were present at the time of occupation of the site, three soils can be classified together as relatively recent in origin. These are the Congaree Silt Loam, the Chewacla Silt Loam, and the Wehadkee Silty Clay Loam. Of these, the Congaree Silt Loam is the best drained and is of a brown to dark brown color and is probably the best soil in the area for row crops. The natural forest cover is oak, hickory, beech, alder, and sweet gum. The only patches of this soil in the area are up the Apalachee River from the site (U.S.D.A. 1965).

The Chewacla Silt Loam is similar to the Congaree Loam but is not nearly as well drained. The color is brown to dark reddish-brown. These soils need ditching and partial draining to allow effective crop growth. The natural vegetation consists of water tolerant trees such as alder, willow, water oak, white oak, and some pine. This is the most common alluvium up the Appalachee River from 9Mg28. The last of the three above mentioned alluvial soils is the Wehadkee Silty Clay Loam. This is a very poorly drained soil with a mottled reddish-brown appearance. It has low fertility and row crops are generally not grown on it. The natural tree growth is of willow, maple, and sweet gum. A large area of this soil is present south and southwest of 9Mg28 (U.S.D.A. 1965).

There are two additional types of alluvial soils in the general vicinity of 9Mg28. These are much older than the three above types and have some different characteristics. The first of these is the Wickham Fine Sandy Loam which is a deep, well drained soil derived from upland soils of the Cecil type. This is a terrace soil which varies from brown to reddish or yellowish brown and does not erode badly. The original cover consisted of hardwoods of several types and pine and crops do well on it. The Joe Bell site is located on this soil type according to the U.S. Department of Agriculture Soil Survey map book for Morgan County. This is probably incorrect, however, as the thin soil at 9Mg28 appears to have derived directly from the rock outcrop upon which the site is located and discussed above. The presence of this small granite pluton would have been unknown to the soil survey because its presence was only confirmed in 1977 as a result of railroad bridge construction. There are, however, large areas of this soil adjacent to the site proper (U.S.D.A. 1965).

The second of the "old" alluvial soils is the Wickham Clay Loam found on old terrace slopes adjacent to areas where the Wickham Fine Sandy Loam is located. These Yellowish-red soils are less permeable and more subject to erosion than the Fine Sandy Loam. The original cover is the same, however (U.S.D.A. 1965).

There are at least two major types of upland soils near 9Mg28. These are divided into two sub-groups, each yielding a total of four soil types. The first of these is the Lloyd group consisting of Lloyd Sandy Loam and Lloyd Clay Loam while the second is the Cecil group consisting of Cecil Sandy Loam and Cecil Sandy Clay Loam (U.S.D.A. 1965).

Lloyd Sandy Loam is the soil on most of the hilltops east and west of the site. It is a deep, well drained, reddish brown to brown soil which is derived from the underlying mixed acid (light-colored) and basic (dark-colored) rocks. It has a darker red subsoil than the Cecil soil. The original forest cover of these upland hilltops consisted of red oak, white oak, post oak, hickory, shortleaf pine and loblolly pine. This soil is moderately good for crop growth (U.S.D.A. 1965).

Lloyd Clay Loam is similar to the Sandy Loam with the exception that the Clay Loam is the soil on the downhill slopes of the same hills with Lloyd Sandy Loam on the top. The Clay Loam Slope soil is not as permeable and thus is more prone to erosion. Its origin and natural tree cover is probably the same however (U.S.D.A. 1965).

The Cecil soils occur primarily up the Apalachee valley from 9Mg28. Cecil Sandy Loam is the hilltop soil type and is derived from the primarily acid producing light-colored rocks beneath. These acid rocks are generally granites, gneisses, and schists. The Cecil Sandy Loam is a yellowish-brown soil and is less red than the Lloyd soils. It is well drained and the original tree cover is the same as that of the Lloyd soils described above with the addition of blackjack oak, dogwood, and sweet gum (U.S.D.A. 1965).

The slope soils of the Cecil type are called Cecil Sandy Clay Loam. These are less permeable and more prone to erosion. The tree cover is the same as the Cecil Sandy Loam and it is yellowish red in color. It also occurs mainly up the Apalachee drainage from the site (U.S.D.A. 1965).

For purposes of discussion the plants growing in the piedmont adjacent to 9Mg28 may be divided into four groups. These are the trees, bushes and shrubs, herbs, and domesticated plants. The last, of course, were species introduced by people. Of the first three groups, many in each were probably used by the people living at 9Mg28.

The tree cover in the area has already been discussed briefly with reference to the specific soil types near the site. The basic climax forest is hardwood with occasional scattered pines and other softwoods. The most common climax period hardwoods in the uplands are white oak (Quercus alba), red oak (Quercus falcata), post oak (Quercus stellata), blackjack oak (Quercus marilandica) and hickory (Carya sp.). Poplar or eastern cottonwood (Populus deltoides), sweet gum (Liquidambar styraciflua), black walnut (Juglans nigra), chestnut (Castanea dentata) and dogwood (Cornus florida) are present in smaller numbers. Upland softwoods are shortleaf pine (Pinus echinata) and loblolly pines (Pinus taeda). The bottomland hardwoods are water oak (Quercus nigra), white oak, hickory, beech (Fagus grandifolia), willow (Salix nigra), maple (Acer sp.), ash (Fraxinus sp.) and sweet gum (Fairbanks 1956, U.S.D.A. 1965). Some pines occur in low quantity.

The understory in the climax hardwood forests contains several types of shrubs and bushes. The hollies are one of the most common, although some of these can grow to tree size. Yaupon (Ilex vomitoria) is one of the forms most commonly used by the Indians. Although probably native only to the Coastal Plain, this was spread into the area by the Indians and it grows well in this area (Hudson 1979).

Bushes and shrubs as well as herbaceous plants, of which there are many, are common, along with grasses of several types, in cleared areas.

The cleared areas may be the result of naturally occurring forest fires or the direct result of clearing activities of men. These plants form the first step in the natural succession of plants that ultimately result in the production of a climax hardwood forest. Most of the herbaceous plants native to the central piedmont are now classified together as "weeds" because no real use is made of them. These include several forms, however, which were commonly and extensively collected by Indians for a variety of uses.

Relatively few plants remains were recovered from 9Mg28. This is not surprising considering the poor degree of preservation common to piedmont soils. Those plants that were recovered and identified will be listed and discussed in Chapter 13.

The density and diversity of animals in a given location is intimately related to the density and diversity of the plants present. Consequently there are many animal species native to the central piedmont climax forests. These can be arranged into several groups: mammals, birds, reptiles, amphibians, fish, and molluscs.

The mammals, of course, form one of the largest of these groups (Golley 1962). Many of these depend upon the products of the climax hardwood forests as prime food sources, although several are carnivorous. Nuts and acorns in particular form a major element in the diet of several mammals important to Indian Subsistence. The black bear (Ursus americanus) is the largest mammal native to the area, although apparently never has existed in other than low population densities (compared to other mammals). White tail deer (Odocoileus virginianus) is the next largest and is generally conceeded to have been the most important meat source for Indian populations. Other important mammals are the raccoon (Procyon lotor), opossum (Didelphis marsupialis), cottontail rabbit (Sylvilagus floridanus), grey squirrel (Sciurus carolinensis), beaver (Castor canadensis), and red fox (Vulpes fulva). Still others are the grey fox (Urocyon cinereoargenteus), long tailed weasel (Mustela frenata), mink (Mustela vison), Eastern spotted skunk (Spilogale putorius), striped skunk (Mephitis mephitis), river otter (Lutra canadensis), Cougar (Felis concolor), and bobcat (Lynx rufus). Smaller mammals include two species of shrews, nine types of bats, and twelve types of mice and rats, eastern mole (Scalapus aquaticus), the swamp rabbit (Sylvilagus aquaticus), the chipmunk (Tamias striatus), the fox squirrel (Sciurus niger), and the Southern flying squirrel (Glaucomys volans) (Golley 1962).

Many types of birds occur in the piedmont near 9Mg28. These include a wide variety of large and small birds. The turkey (Meleagris gallapavo) is the species found to be the one most often utilized as a food source by Indians of the southeast. A total of 233 species of birds has been identified in the Athens area, some 30 miles to the north (Tramer 1968). Out of this total, 94 are known to presently have breeding grounds in the area (ibid: 16). Whether this was true when the site was occupied is unknown, but probably most of the same species were present. Most of the non-breeding forms are migratory species present in the fall and spring only. Birds that are common permanent residents are: turkey vulture (Cathartes aura), black vulture (Caragyps atratus), bob-white (Colinus virginianus), screech owl (Otus asio), barred owl (Strix varia), red-bellied woodpecker (Centurus carolinus), downy woodpecker (Dendrocopos pubescens), blue jay (Cyanocitta cristata), Carolina chickadee (Parus carolinensis), tufted titmouse (Parus bicolor), brown-headed nuthatch (Sitta pusilla), Carolina wren (Thryothorus ludovicianus), mockingbird (Mimus polyglottos), brown thrasher (Toxostoma rufum), eastern bluebird (Sialia sialis), pine warbler (Dendroica pinus), red-wing blackbird (Agelaius phoeniceus), cardinal (Richmondena cardinalis), and the rufous-sided towhee (Pipilo erythropthalmus) (Ibid). Most of these birds would have been seen daily by the inhabitants of 9Mg28. The remains of a few were recovered archaeologically and will be discussed in Chapter 13.

No specific information about the amphibians and reptiles of the Wallace Reservoir area itself is presently available. In the state as a whole, however, there are presently some 35 species of salamanders, and 28 species of frogs and toads, 23 species of turtles, 13 species of lizards, and 40 species of snakes (Martof 1956). The most common river turtles at the present are the river cooter (Chrysemys floridana concinna), the map turtle (Graptemys geographica), and the soft shelled turtle (Trionx ferox) (Shapiro 1979). The box turtle (Terrapene carolina carolina) is the most common land turtle. All of these turtles were probably food sources. Those recovered at 9Mg28 will be discussed in Chapter 13.

Twenty-four species of freshwater fish are known from the Oconee drainage (Dahlberg and Scott 1971) at the present time. The most common of these are catfish (Ictalurus sp. and Noturus sp.), suckerfish (Hypentalium nigricous), bass (Microterus sp.), sunfish or bream (Lepomis sp.), perch (Ethenstoma sp.), shad (Alosa sapidissima), and and redhorse (Moxostoma sp.). Additional fish present are bowfin (Amia calva) and garfish (Lepisosteus sp.). There are differences in fish species present at different points along the Oconee depending on whether the location is one of slow deep water or shallow rapids (Shapiro 1978:34). While deeper water exists above the site on the Apalachee and Oconee, there is an area of shoals some 300 yards down stream from 9Mg28. Access to species of both environments makes 9Mg28 well situated for the purpose of obtaining fish from both microenvironments. Fish remains recovered are discussed later.

Molluscs are common and locally abundant along the Oconee now as in the past. The two major clam genera are Elliptio and Lampsilis. These vary slightly in form depending on where they grown in the river muds and silts. They were consistently used as a food source in Lamar Period sites in the Wallace Reservoir. Moderate quantities of the shell consistently show up in garbage middens, 9Mg28 included. The most common univalve in the river is the genus Goniobasis. These small rock snails grow primarily on the mosses covering the rocks at shoals. Their use as a food source will be discussed later. Other univalves present in the Wallace Reservoir area include the genera Amnicola and Campeloma. Additional bivalves identified from the area are of the genera Lasmigona and Pisidium (Rudolph 1980). Land snails include the genera Tridopsis and Helicodiscus. These are present in garbage middens at 9Mg28 but may be accidental or non-cultural inclusions. They are not common enough in middens to conclude that they were a food source.

There have certainly been some changes in the environment of 9Mg28 between the time of occupation of the site and the present. Although the climate has probably stayed about the same, the modification of the landscape through the development of modern agriculture has been great. The large Georgia Railroad earthwork just north of the site was constructed in 1843. This has certainly altered the flooding pattern of the two rivers at their junction and the subsequent patterns of silt deposition and, ultimately, soil fertility. The quantity of silt deposited in the river bottom and the flood plains has been temendously accelerated due to the extensive upland clearing for agriculture in the 19th and early 20th centuries (Trimble 1974). The river now floods more easily as it has filled its channel with silt. Silt has built up in the bottoms and raised the water table creating some marshy areas which were formerly dry. Almost all original upland and bottomland hardwood areas were cleared for farming in the nineteenth century, although much of this is now kept in pine trees for the paper industry. Animal species adapted to hardwood forests have thus changed in type and proportion as well as quantity as a response to these human modifications to the landscape. If inhabitants of 9Mg28 during its period of occupancy could see the same area now (or before it was flooded by Lake Oconee) they would have probably have great difficulty believing it was the same place. Conversely, it is only with great difficulty that we can imagine what the environment was like at that time. Probably the most obvious difference we would note would be the large expanse of hardwood forest, perhaps right up to the site and its fields (we do not know where these were in relation to the site). Also, the river would run clear, with no mud. (What would the Oconee look like without its red mud?!) In any event the environment in which the site is placed would have been described as rich and food sources were plentiful.

# CHAPTER 3

## PREHISTORIC SETTING

The goal of this chapter is to establish a prehistoric setting as a background against which the Joe Bell site may be analyzed. Any prehistoric setting is here taken to involve two major steps. The first is the establishment of a space-time framework for a site through comparative analysis of material culture items. Of all that is preserved in the archaeological record, ceramics in the form of pots or pot sherds have been repeatedly shown to be out most sensitive indicators of space and time variation. Thus these have played an important role in space-time studies of those past societies that were producers of pottery. This first step occupied the attention of archaeologists in the U.S. for many years to the exclusion of other concerns. The development of dating methods such as radiocarbon 14 certainly improved dating but it has been no panacea.

The second step in establishing a prehistoric setting is to describe the lifeways of the people during each part of the framework resulting from step one. This has been the overriding concern of archaeology in this country for several years. Most areas in Georgia have had very little work done on this step, however.

In order to understand the chronology of the Joe Bell site specifically and that of the Wallace Reservoir area generally, I first want to outline the late prehistoric chronology of Central Georgia as known before the discovery of the Joe Bell site in 1969. The reason the Central Georgia sequence is here selected for review is that Macon is physically close to the Wallace Reservoir (only 50 miles) and the Macon sequence is well described, especially by Fairbanks (1952, 1956).

In Central Georgia the Macon Plateau site was occupied from about A.D. 950 until about A.D. 1200 by a group of people so different and distinct culturally that it has been long argued that they are not the descendants of earlier native Central Georgia populations. The concept of migration and intrusion has certainly been much abused in the past by archaeologists, but no clearer example than Macon Plateau exists in the Eastern U.S. That it represented a middle Mississippian settlement from the north and west is here accepted.

Although the impact of this culture was probably strong in the immediate vicinity, no direct impact was felt in the rest of Central Georgia. Certainly no evidence of Macon Plateau materials were found in the Wallace Reservoir. As Macon Plateau declined and faded by A.D. 1200 or so, the Lamar culture, first known from the Lamar site near Macon, began probably as a result of interaction between native Central Georgians of the South Appalachian tradition (Caldwell 1958) and the Mississippian peoples of Macon Plateau and other sites to the west on the Chattahoochee River. We will never know where Lamar actually began (it depends on how one defines Lamar as much as anything else) but it may be that it originates in the fall line region between the Chattahoochee and Ocmulgee Rivers.

Lamar culture within the present state of Georgia can be characterized in a number of different ways. Lamar sites are not particularly large by Mississippian Valley standards. Domesticated plants - corn, beans, and squash - were probably grown and utilized, although reliance on hunted and gathered food sources apparently continued to be very important. The largest sites have two or three mounds, perhaps surrounded by a palisade (Fairbanks 1952). The majority of the population apparently lived in small scattered moundless villages throughout the area. The smaller settlements were not restricted to the large river valleys as were the large ones with mounds. Burials were flexed, grave goods not common, and houses were generally rectangular wattle and daub, although some variation is known. Southern Cult symbols and paraphenalia occur but sporadically (Fairbanks 1952).

A number of distinctive traits characterize Lamar ceramics. There are two basic forms involved. The first of these vessels are medium to large excurvate rim jars which generally had conoidal bases. The surfaces are often covered with complicated designs applied with a carved paddle stamp. The designs, generally poorly applied and overstamped, consists of figure 9's, circles, crosses, and other more complex forms. Some jars were undecorated. The rims of these vessels are folded out and generally modified by pinches, notches, or punctates of various sorts. In fact this rim form is one of the most consistent and distinctive attributes of the Lamar ceramic complex. The jars were all tempered with grit and sand.

The second vessel form common to Lamar complex is the medium to large sized cazuelabowl. These have incurving rims, generally without the folds found on jars. The upper two to three inch wide portion which curves inward is decorated with boldly incised lines (3-5 mm wide), generally forming interlocking scrolls around the circumference of the vessel. The lower portions of these bowls are either plain, often burnished, or complicated stamped in a manner identical to the jars described above. The bottoms of these bowls were flat. The temper was of almost all vessels is grit.

There are other rare forms known but they need not concern us here. Some knowledge of changes through time in the ceramic attributes of the Lamar ceramic complex is available. The Central Georgia Lamar Period has been divided into two chronologically defined phases, Stubbs and Cowarts (Williams 1975). The bold incising, one of the elements present on the bowls, apparently is added to the ceramic complex in Cowarts Phase, being virtually absent in the earlier Stubbs phase. The ultimate source for the incising is not known with any certainty, but it had been an important part of Mississippian cultures to the west for some time. There is no incising in the Macon Plateau ceramic complex.

Although Lamar period materials are rare on the Macon Plateau site itself, during the later Ocmulgee Fields period materials are plentiful. Associations at the trading post on the site shows conclusively that the Ocmulgee Fields cultures dates to the late 17th and early 18th centuries and is almost certainly Creek, probably Hitchiti (Fairbanks 1956, Swanton 1946). Surveys have shown a fairly wide distribution of these materials west to east along the fall line throughout Georgia (Huscher 1972, Mason 1963). There are differences between Ocmulgee Fields and Lamar Culture. Typical habitation sites of Ocmulgee Fields are generally smaller and fewer in number than for Lamar. There are no sites with mounds and no palisaded villages are known and evidence for social stratification is minimal (Fairbanks 1952). Food sources for both Lamar and Ocmulgee Fields appear to be about the same with the addition of a few European items such as peaches to the latter. We know historically that hunting practices were drastically altered through the institution of the deer trade. The addition of guns to the weapon list of the Indians made it profitable to spend much more time hunting and killing deer for the English skin trade rather than just for subsistence (Mason 1963).

The ceramics of the Ocmulgee Fields culture also vary from that of the Lamar. The two basic shape classes of Lamar (the excurvate rim "jar" and the incurved rim "bowl") remain, although some new form probably derived from European shapes are present. The first and most obvious difference is the total lack of stamping on the pottery. On the jars a technique of crude brushing of the un-fired surfaces replaced the stamping. On bowls (and also on some jars) stamping was generally replaced with simple plain (smoothed or burnished) surfaces. Jars often have strap handles, none being present on Lamar jars. Incising is still present on the upper portions of cazuela bowls but it is done in a distinctly different manner. While the incising on Lamar vessels had been formed from wide, fairly deep cut lines relatively carefully placed, those on Ocmulgee Fields vessels were narrow (generally one mm or less), fairly shallow, and the designs formed by the lines neither carefully planned nor applied. Although there is general similarity in the incised designs on both Lamar and Ocmulgee Fields vessels, the latter is generally subjectively described as a "sloppy", or "degraded" version of the former. The lips of Ocmulgee Fields bowls are also distinctly different. While these were a simple, unmodified straight form on Lamar bowls, those of the Ocmulgee Fields vessels were enlarged and flattened on the top. In addition Ocmulgee Fields bowl lips often had notches not present on Lamar bowls. Also the Ocmulgee

Fields bowls formed a fairly sharp angle at the point near the top where the vessel curved in, while the Lamar bowls curved gently inward near the top. The bottom of both jar and bowl forms were rounded during Ocmulgee Fields times. Those of Lamar were flattened on bowls and coinoidal on jars. Ocmulgee Fields vessels were generally smaller than those of Lamar age. Additionally, temper on many Ocmulgee Fields vessels was either of ground shell or small carbon flakes. Although some grit was used it was not as universal as in Lamar vessels. Finally some Ocmulgee Fields vessels were red-filmed while no painted vessels are known for Lamar.

Fairbanks has argued that Ocmulgee Fields ceramics are derived directly from Lamar ceramics through technological evolution (Fairbanks 1952, 1956, 1958). However, the problem is not so simple or clear cut. One is not persuaded by his argument that the brushed surfaces on Ocmulgee Fields jars derived directly from the carved paddle complicated stamped surfaces on Lamar jars. There is no apparent reason why this should be true. It appears now that the origin and development of Ocmulgee Fields pottery may be best understood through a knowledge of the development of almost identical ceramics in the Creek heartland of East Central Alabama (Huscher 1972, Smith, personal communication).

Following the discovery of large numbers of ceramic vessels at the Joe Bell site in 1969, (the details will be related in the next chapter) attempts to place them into the proper existing ceramic and chronological typologies caused some immediate problems. There were no stamped vessels among the sample, and the incising, which was present, was formed of very narrow lines. These two traits immediately were recognized as indicative of Ocmulgee Fields pottery. Indeed, as we shall shortly see, several researchers felt this reason enough to label the material by this appellation and leave it at that. There are several problems of negative evidence here, however. First, there is no brushed pottery at 9Mg28, the surfaces of all vessels being either incised or plain. Second, there are no red-filmed vessels, and third there are no vessels with European derived shapes.

A number of other facts were incongruent also. Although most of the incised vessels had narrowly incised lines, most of them could hardly be considered as sloppy. In fact, incised designs on the majority of the vessels are among the most complex and most clearly executed known from Georgia. Many incised vessels had scroll designs formed from large numbers of carefully placed parallel lines - numbering 20 or more (44 in one case). Most Ocmulgee Fields (and Lamar) incised vessels had far fewer elements in the designs, often only three to five. Temper on all vessels was uniformly grit, a Lamar trait. Bowl shapes were most similar to Lamar. Additionally all bowls had flat bottoms, another Lamar trait. Jars had folded rims, which could apply to either ceramic complex. The lips of bowls were not of the complex flattened form common in Ocmulgee Fields (with one strange exception) but of the simple form associated with Lamar. Vessel size ranged from very small to extremely large. No handles were present on any vessels, again the pattern is more similar to Lamar.

It was clear from the first, then, that the vessels from the Joe Bell site did not fit well into either Central Georgia ceramic complex. While it had characteristics of each, it was certainly not identical with either, and to call it by either term would involve too much forcing of the data.

Another group of pottery types were located at a different part of the Joe Bell site. These include first, plain grit tempered pottery, and secondly a minority of a peculiar type with incised cross-hatched lines combined with parallel vertical lines on pots with folded rims that were always punctated with a hollow reed cane. At the time of initial discovery these were thought to be of a similar age to the rest of the site material, although there was indeed a very small amount of stamped pottery with this new material. The cane punctated folded rim on this new material clearly related it to Lamar as broadly known, but the cross-hatched motif was unknown from anywhere else in Georgia.

Radiocarbon samples were obtained from charcoal found associated with the ceramic vessels. These dates were A.D. 1670 $\pm$ 70 (UGA 140) and A.D. 1695 $\pm$ 55 (UGA 252) (Appendix B). The former was made on a charred log while the latter was from small univalve molluscs (genus Goniobasis). The lateness of these dates was somewhat unexpected. These dates placed the material as almost the exact age of Ocmulgee Fields material at Macon (and Milledgeville on the Oconee), but, as has been shown, it was not identical to Ocmulgee Fields materials. Several hypothesis were developed informally to explain the discrepancy.

One early hypothesis was based on several observations, namely that: (1) Colonel James Moore brought back many Apalachee Indians from Northwest Florida following his 1704-5 raids and settled them on the Savannah River somewhere south of Augusta; (2) the Joe Bell site is at the mouth of the Apalachee River; and (3) some of the ceramics from the site were reminescent of some ceramic types defined in 1949 for Northwest Florida by Gordon Willey (Willey 1949). The hypothesis drawn from these facts is that the Joe Bell site might have been occupied by a remnant group of Apalachee Indians brought north by Moore who moved from the Savannah River further to the west.

A second hypothesis was simply that the Radiocarbon dates which could allow the above hypothesis to be reasonable could have been in error. The third hypothesis stated simply was that the carbon dates were correct, but the group was from some other unstated location than Northwest Florida. The fourth hypothesis, conceptually the simplest, was that the dates were correct and the remains at 9Mg28 represented local cultural development that simply was different from the Macon-Milledgeville area 40 miles to the south.

The first of these hypothesis can now be rejected out of hand. First, although I still have no idea how the Apalachee River obtained its name, it apparently didn't receive it until the 1780's. Prior to that time it was called the "South Oconee River". Indeed, to this day there is a "North Oconee" and a "Middle Oconee" rivers which join just south of Athens, but no "South Oconee", its name now being the "Apalachee". The ceramic similarities between Florida and those from the Joe Bell site are apparently specious. The material in question from Florida is probably 800 years too early, and no amount of speculation can bridge this time gap. Finally, the radiocarbon dates themselves required modification after the 1973 publication of the bristlecone pine correlation studies, which showed errors between radiocarbon dates and actual years (Ralph, et al. 1973:6-7). Although there are other correction curves now available, the difference at such a recent time period is minimal. The 1695 date corrects to 1630, while the 1670 date becomes about 1620, making the occupation too early to have been related to Moore's Apalachee Indians. Another reason this hypothesis is unreasonable is the virtual lack of European trade materials on the site. Although a few items (beads and peach pits) were eventually recovered, the quantity is too low to have reasonably represented the remains of the missionized Indians of Northwest Florida in 1705.

The possibility of error in the carbon dates, apart from the tree ring corrections, still exists. Indeed four dates from samples recovered in 1977 were uniformly unusable (Appendix B).

As for the hypothesis that the group responsible for producing the material at 9Mg28 was from somewhere else, there simply is no evidence as to where that place might be. In addition, although this was unknown in 1969, sites with material similar to 9Mg28 are now known from throughout the Wallace Reservoir area and on up the Oconee River as far as Habersham County. The third hypothesis then has little to recommend it and must be tentatively rejected.

The fourth hypothesis, that the material cultural items found at the Joe Bell site are the result of in place cultural evolution on the Upper Oconee drainage, is left as the most probable one. The primary reason that this hypothesis was not the first choice originally was a general lack of information about the specific evolutionary history of the Upper Oconee Area. Prior to 1969 virtually no excavations had taken place either in the vicinity of the site or further to the north. Gordon Midgette had conducted small scale excavations at the Scull Shoals mound site north of Greensboro in the mid 1960's, but results of the work have never been published (Kelly, personal communication).

It must be noted that when 9Mg28 was first discovered and initially excavated, no knowledge of the future construction of the Wallace Reservoir was at hand. By 1971, however, the details of the large

Georgia Power project were known and the first surveys of the impact area were started. Conducted by Butch Smith, this first survey involved contacting local informants on site locations and included some field exploration. No report was ever made on this phase of the survey, but most of the information derived from it was incorporated into later work.

Additional survey work was undertaken in 1973 by Lee and Wood, by Wood in 1974, and by DePratter in 1974 and 1975 (Wood, personal communication, DePratter 1976). Through this survey, data was obtained which would for the first time allow a chronological framework specifically tailored to the Upper Oconee area to be produced. The framework first developed and published in 1976 by DePratter borrowed heavily on both widely accepted general terminology for the Eastern U.S. and specific parts of the Macon and Northwest Georgia chronologies as worked out in the 1950's. The following discussion outlines DePratter's ceramic chronology.

The units of classification for DePratter's scheme vary. Although the section title emphasizes phases (1976:455), in fact phases, periods, and unqualified units are all used. The dates supplied by DePratter are added parenthetically in the following discussion. The first unit listed is "Paleo-Indian" (15,000 to 8,000 B.C.). No evidence was found in the early survey work for this period, although some was recovered in the intensive 1977-78 survey work. For the succeeding Archaic periods, Early Archaic (8000 to 5500 B.C.), Middle Archaic (5500 to 3000 B.C.), and Late Archaic (3000 to 1000 B.C.) the evidence is somewhat clearer, although not overwhelming. Sites are present but not common for Early Archaic. Stratified Middle Archaic sites were located and some were later excavated. Late Archaic shell midden sites were conspicuously absent, although a few non-shell midden sites of this period were located.

DePratter says that "Woodland Period" (1000 B.C. to 1000 A.D.) sites are "fairly well represented in the Wallace Reservoir." (ibid: 469). He divides this period into two phases, the "Cartersville phase" (500 B.C. to 100 B.C.) and the "Swift Creek phase" (100 B.C. to A.D. 500). The earlier of these two is derived from the work of Caldwell in Northwest Georgia while the latter is based on A.R. Kelly's Macon area work from the 1930's (Caldwell 1970, Kelly 1938). No phase designation or discussion of the late Woodland A.D. 500 to A.D. 1000 time period exists in DePratter's work. Although this might be read to imply that there was no human occupation in the Reservoir area during this period, this is extremely unlikely. Lack of knowledge about Late Woodland is not limited to the Wallace Reservoir area but is simply indicative of a statewide pattern. We simply do not know much about this period.

Following the Woodland period in DePratter's chronology is the "Mississippian Period" (A.D. 1000 to 1700). This is divided into three phases, the Etowah Phase" (A.D. 1000 to 1300), "Lamar Phase" (A.D. 1300 to 1500), and finally the "Ocmulgee Fields Phase" (A.D. 1500-1700). The former of these three phases is derived from the Northwest Georgia sequence, while the latter two are based directly on the Macon chronology. Although Etowah material is present in the reservoir, it certainly is not as common as material from the latter two phases, the periods of highest prehistoric population density. DePratter's chronology concludes with a "Historic Period" which includes everything, both European and Indian, after A.D. 1700.

DePratter's chronology is basically formed by attempting to place the initial Wallace survey material into existing chronologies for Central and Northwest Georgia. This is certainly preferable to creating new units without excavation data to back them up. Continued work in the Reservoir made it clear, however, that different formulations would be necessary to understand and adequately describe the Wallace situation, particularly for the post A.D. 900 period sites. It turns out that the Wallace area is significantly different from both the Macon and Northwest Georgia areas.

The major analytical work on the Wallace material prior to the period of intensive survey and excavations in 1977-78 was the dissertation work of C.H. Lee (1977). In it he attempted to analyze the settlement pattern of what he called the "Late Mississippian period". Lee assigns the "Lamar phase" to this period and dates it from A.D. 1400 to 1700 (1977:5). He then proceeds to show how different areas of site density may be seen for different parts of the reservoir area and equates these with socio-political subunits of the entire population. The biggest porоblem with Lee's approach is simply that he had no way of separating the sites used in his patterns into smaller time periods than the full 300 year interval. Thus, many of the sites used to delineate specific patterns may have been hundreds of years apart in time. It must be remembered, however, that data for the required fine chronological divisions necessary were not available to Lee. With 20-20 hindsight studies such as his would have more appropriately been done after this fine tuning.

Lee classified 9Mg28 as one of his "Class I" sites, these being considered to be "the major centers of the area" (1977:95). Whether this can be assured based upon the data presently at hand will be discussed later. In his discussion of the ceramics from 9Mg28 Lee says, "The majority of incised pottery from 9Mg28 is considered to be Ocmulgee Fields Incised..." (ibid:102). As demonstrated above, this designation must be revised.

The critical excavation and analysis for the post 900 A.D. chronology of the Wallace Reservoir area were conducted by Marvin Smith. These results have been initially reported in two separate papers, dealing, respectively, with the earlier and later portions of this sequence. The early portion is detailed in "The Etowah Period in the Wallace Reservoir" (Smith 1979). In it he delineates two ceramic phases and discusses the characteristics of the pottery in each. The earliest Etowah phase is the Armour Phase. One carbon date of A.D. 905 from the Cold Springs mound (9Ge10) is noted by him for this phase, but no temporal range is suggested. Ceramics are complicated stamped and plain. The complicated stamped sherds are broadly similar to Sears' Etowah I and II material from Northwest Georgia (Sears 1958). Certain motifs are absent, however, and others not found by Sears are present. The regional distinctiveness is clear but the overall affinity to Etowah ceramics is undoubted.

Following the Armour Phase is the Stillhouse Phase (Smith 1979:4). There is some confusion about the projected dates for this phase. While in the present paper Smith cites approvingly a radiocarbon date from Dyar Mound (9Ge5) of A.D. 1015, his second paper to be discussed shortly, guess dates the phase from A.D. 1250 to 1375. Whether the latter range is too late or the Stillhouse phase goes all the way from A.D. 1000 to A.D. 1375 is not certain.

The ceramics of the Stillhouse phase are still clearly related to the Etowah ceramics of Northwest Georgia. Again, there are distinct regional differences to be noted in these ceramics. Filfot cross and line block motifs, common in Northwest Georgia, are not present in Wallace at this time. Check stamped sherds are not in the related Etowah complex of Northwest Georgia but are present in Wallace. The second paper by Smith is "The Development of Lamar Ceramics in the Wallace Reservoir: The View from the Dyar Site, 9Ge5" (Smith 1978). The Dyar site, excavated by Smith, was the largest mound site located in the Wallace Reservoir Project. It apparently was first settled during the late Etowah Stillhouse phase previously discussed. The pre-mound midden and early mound stages are assigned by Smith to this period (1978:2). Although this does represent the beginnings of the large mound Smith has pointed out that sites of both the Armour and the Stillhouse Phases are not common in the Wallace Reservoir (1979:8).

The following phase, the Duvall Phase, is one of the large population increase throughout the area. Smith dates this phase of the Lamar period from A.D. 1375 to 1475. This is presumably the first phase to which the term "Lamar" may be applied in its broadest sense. Of all the phases in the Wallace late pre-historic sequence, however, Duvall provided the biggest deviation from the expected. Duvall phase ceramics are apparently unique to the Upper Oconee area. No similar ceramics have been found in the Macon area, Northwest Georgia, Northeast Georgia, Lake Hartwell, or Savannah River areas surrounding the Upper Oconee. These ceramics are different from other ceramic complexes in Georgia in a number of characteristics. First, the greatest percentage - often above 90% - of the pottery is plain. Complicated stamped pottery is very rare or absent. Incised pottery makes its first appearance in the Upper Oconee area during the Duvall Phase. It is not like the Lamar Bold Incised of Central Georgia, the earliest incised pottery there. Duvall Phase incised pottery, denominated Morgan Incised, is unique to the Upper Oconee area and no source for its origin within the area is known. This type, and its uniqueness, was what first raised interest in 9Mg28, the site where it was first recognized. The incising consists of finely incised lines placed vertically on the upper portions of long, straight necked jars. The closely spaced vertical line sections are separated by areas of cross-hatched incised lines placed at 45 degrees to the rim plane. This cross-hatched motif is unknown from other areas in Georgia at this time period.

Rim forms on Duvall Phase ceramics consist of either narrow folds, or more often an added rim strip, which are punctuated with a hollow reed cane at close intervals around the full perimeter of the rim. This mode of rim strip modification has long been attributed to Lamar, but chronological placement within Lamar has never been known. It is early in the Wallace Reservoir Lamar sequence and this may also be true for Central Georgia. Similar rim treatment occurs at the Irene site near Savannah and is prominent in Pee-Dee period sites of South and North Carolina.

Mound construction continued at the Dyar site during the Duvall Phase. Overall population density apparently increased sharply in the reservoir area (and outside) during this phase. Sites of this phase are much more common than those of the earlier Stillhouse Phase.

The transition to the next phase, the Dyar Phase, involved continued increase in population and population density, but the increase was not as dramatic as between the preceeding two phases. There are several clear ceramic modifications which make the Dyar Phase distinct, however. First the proportion of plain pottery decreases while that of complicated stamped increases. In addition, the incised pottery is quite different in design and technique. The incising now consists of wide (>4 mm) lines that form scrolls on the upper portions of incurved (cazuela) bowls. In other words, the incised pottery is like Lamar Bold Incised as defined for the Macon area. Complicated stamping occurs on medium to large excurvate rim jars. Stamping is never as common as it is in the Macon area or the north in the Lake Hartwell-Tugalo area. Folded and pinched or notched rims are the norm for jars, while bowls have simple, unfolded forms. Cane punctated rims apparently dropped from use.

Construction of the Dyar Mound apparently reached its completed form during this phase. Smith (1978:6) dates the phase from A.D. 1475 to 1600. This implies that mound construction ceased at or shortly after the De Soto entrada in the Southeast. Although it is doubtful that he ever came as far north as the Dyar site in his journey to Cofitachequi, recent research by Hudson, Smith and DePratter does make his route further north than had once been supposed (Hudson, personal communication). No 16th century European items have apparently been recovered from the Wallace project.

Population density for the area as a whole was probably at its greatest during the Dyar Phase. In that sense this is the climax period for the area. In fact the population density for the Reservoir area has not been as high even to the present day. In fact, only a handful of people were displaced by the recent project.

Very little is known about the transition of the following Bell Phase, the time of the major occupation at 9Mg28. Bell Phase (the phase is named after the Joe Bell site) has already briefly reported on by Smith in his 1978 paper. Date estimates for the phase are A.D. 1600 to 1675. These estimates are based on radiocarbon dates and European trade material types. Although no mound construction was performed during the Bell phase, a very small amount of material from this phase has been found in the very top levels at Dyar Mound. Site density during this phase is still high, but perhaps not as much as in the preceeding phase. There appears to be little doubt, however, that Bell Phase ceramic complex is derived from Dyar Phase ceramic complex. There are some changes in the ceramics as well. First, there is no complicated stamped pottery during Bell Phase. Pottery is either plain or incised. The incising is somewhat different from that of the preceeding Dyar Phase and from that of other 17th century phases elsewhere in Georgia. Although there is a fairly wide variety of decorations, the incisions are generally neatly applied and consist of a larger number of elements than any other late incised wares in the state. Vesssel forms range to many types of bowls and jars just as in Dyar Phase. Rims are plain or folded with rather wide folds. Jim Rudolph has shown that rim strip widths become progressively wider throughout the Duvall-Dyar-Bell continuum (1980). Significantly missing from the Bell Phase ceramic inventory, as compared to the 17th century Ocmulgee Fields material from Macon, are both the roughened or brushed surface and red filmed pottery types.

It should be pointed out here, however, that the distribution of Bell Phase sites is apparently limited to the North Oconee River area and is the same as the preceeding Dyar Phase. Materials have been recovered by occasional surveys outside the Wallace area and the distribution presently appears to include all of the Oconee and its tributaries from just below the Wallace Dam to the headwaters region in Northeast Georgia. This is based upon my own inspection of collections housed at the University of Georgia.

The estimated terminal date for the Bell Phase is conditioned by the fact that no 18th century Indian sites have been located in the Wallace or North Oconee areas. It seems improbable that no people were living there then, but no archaeological evidence is available which supports the idea. What happened to the 17th century inhabitants of this large area is uncertain, although they may have been among groups which retreated toward the Chattahoochee to form the Creek Confederacy.

# CHAPTER 4

## Excavation and Feature Descriptions

The following chapter is descriptive. A history of the discovery of and the first work at the site is followed by a detailed report of the techniques of excavation and the features discovered at the site. The intention is to avoid discussion of the use, function, and meaning of these features at this point and to deal only with form. Features will be described sequentially and not classified into similar form classes. Also, discussion of the recovered artifacts will be minimal. All of these topics will be taken up in later chapters.

The Joe Bell site was first visited in December of 1968 by Marshall Williams, the author's father, at the suggestion of the land owner for whom the site is named. Mr. Bell had apparently noted sherds and other items of Indian manufacture on the site years before, when it was being regularly plowed. The site was in fescue pasture in 1968, however, and was never to be plowed again. Mr. Bell had signed a lease with the contractors constructing Interstate 20 six tenths of a mile south of the site to supply fill soil from the field in question. Williams and the author discovered a few areas of the field which had been disturbed by bulldozers testing the site for depth of topsoil.

Large quantities of sherds were collected from the disturbed areas of the site. At least four different areas of the large field were somewhat randomly separated for collecting purposes and a few five foot square test pits were excavated in the different areas. All areas produced pottery thought to be late prehistoric Lamar types.

Area 1 excavations consisted of two five foot squares placed in this the most southern of all the designated areas (Figure 4). The soil consisted of coarse grain sands and the layering present made it clear that these were flood deposits. Sherds, mostly small, were deposited throughout the sand, which was about one foot thick. Recovery was with a 1/2" mesh screen. The soil beneath the sand was sterile. Many of the incised sherds recovered were of the then unknown Morgan Incised type, a marker for Duvall Phase (see previous chapter). A linear feature was found running east-west diagonally through the test pits in their floors. The fill was a dark humus contrasting with the sterile red clay. Initially thought to be a wall trench, this feature was followed for some 50 yards in both directions away from the test pits by a series of short perpendicular trenches placed to intersect the line of the feature.

Dr. Joseph Caldwell, of the University of Georgia, suggested that this long feature might be a part of a fortification wall similar to the type he had discovered at the Woodstock site (9Ck85f) in the Allatoona reservoir in the late 1940's (Caldwell 1970). If so, he predicted, a parallel feature should be present some five feet away from the first one.

Excavations quickly showed that there was indeed another linear feature parallel to the first. Both features were about seven inches wide and were shallow and concave in cross-section. The shallowness of the features and lack of posts found in them precluded the idea of wall trenches, however. No artifacts were found in the fill of the features at any point. Erosion had destroyed both ends of the 150 foot long parallel features. Although it is uncertain, the features are presently interpreted as the stains from rotted log sleepers for a plank road of probably 19th century date, and thus the original fortification idea was dropped. The road was heading toward the river in the general vicinity of which a 19th century handle factory was reputed to have been located (Bell, personal communication). The sand and sherds over the feature, washed in after the road was abandoned. A total of four more five foot square units were excavated in Area 1 in 1977 as part of the major excavations at the site to be described presently. These were screened with 1/4 inch mesh screen. Additionally, one large trash feature was uncovered in 1977 by earthmoving activities associated with the new railroad bridge construction in an area up the hill toward the river from Area 1. This is the probable location for the Duvall Phase village from which the washed in materials of Area 1 had been derived via flooding. This feature will be described in Chapter 4.

Area 2 was some 500 feet northwest of Area 1 (Figure 4) relatively close to the railroad tracks. The situation here was similar to that of Area 1 in that a thick (nearly two feet) layer of coarse sand was again present. Large quantities of relatively small potsherds were again mixed with the sand. A total of five complete and three partial five foot squares were excavated in this sand in 1969 and 1970. Most were screened with 1/2 inch mesh screen, but several were hand troweled. One additional five foot square was placed adjacent to these in 1977. No features were noted in the floors of any of these test pits. That all of this sand was washed in was clear when an early 20th century brass shotgun shell base was found in direct association with the Indian ceramics in Square 7 of Area 2.

The ceramics of Area 2, while clearly of late prehistoric date, had some distinct differences from most of those in Area 1. Virtually no Morgan Incised was found and a moderate amount of complex mutli-line incised scroll designed sherds was located. The collection is now known to be a Bell Phase collection, some 150 to 200 years later than that of Area 1. In fact, Areas 1 and 2 of 9Mg28 should probably have separate site numbers though this had not been done.

Area 3 was tested by a single five foot square placed slightly closer to Area 2 than 1 and somwehat closer to the river than either (Figure 4). This was selected for testing as an area between Area 1 and Area 2. The Sand was fairly thin at this location, though sherds were located. Screening was again with 1/2 inch mesh. No features were located, and no further work was done in this vicinity. The quantity of material recovered here was significantly less than in Area 1 or Area 2.

The only one of the four area designations made in 1969 which was directly adjacent to the river was then designated Area 4 (Figure 4). This was in the southeastern portion of the large pasture on top of a high hill overlooking the river at that point. It is now set aside as a different site (9Mg218). At low water times in the lake today this is exposed as an island.

No formal excavations were carried out in Area 4 in 1969. The area was designated on the basis of scant surface finds of a few sherds and a few 19th century historic items. In 1977, following the removal of trees along the bank, another collection of items was made. Several pieces of iron items-spikes, pulley fragments, and large brace pieces, as well as stoneware and ironstone fragments were located. These tend to confirm this location as that of the 19th century handle factory. Historic research to confirm this has not been undertaken for this report however.

In the spring of 1979, as the waters of lake Oconee were backing up, an examination of the southern portion of this knoll revealed midden turned up in the track of a bulldozer which had recently gone over the area. Excavations were undertaken by the author with volunteer help from several individuals over a three weekend period and a large feature, filled with ceramics was excavated. The location was formally given the site designation of 9Mg218, mentioned above, although nothing is known of it other than the information recovered from this large pit. The date was from Late Dyar to Early Bell Phase. A description of it will be given later since details of its construction are pertinent to analysis of similar features on 9Mg28 proper.

Designation of these areas and initial test excavations took place with volunteer labor in the winter and early spring of 1969. Although fairly large collections of potsherds and a few other artifacts had been recovered, no features dating to the period of Indian occupation had been located. The strike of sand layers in Areas 1 and 2, as well as the increased elevation toward the river from both places made it fairly clear from where the artifacts in the sand layers of Areas 1 and 2 had come. Attention was then focused on the area between these two areas and the Oconee River. Brief tests of these areas showed that there was very little topsoil over the hard, red clay subsoil. Although it was felt that sub-surface features and posts were probably present in these areas, the slow nature of hand excavations were deemed inappropriate for the task. In addition, as construction on the Interstate 20 project to the south continued the possible destruction of the site was very real.

After consultation and in agreement with Dr. Joseph Caldwell it was decided that the controlled use of heavy earth moving equipment was in order. The Morgan County Board of Commissioners loaned a road grading machine and operator on the morning of Saturday, May 9, 1969 for the purpose of stripping the topsoil off of selected spots on the site. A total of twelve strips, roughly 200 feet long and ten feet wide each were placed over the site. Nine were placed in the area northeast of Area 2 closest to the railroad, two were placed near the river up from Area 1, and one was placed on the knoll of Area 4 (Figure 4). Nine of the twelve cuts showed no signs of occupation upon first examination. Two adjacent cuts in the area northeast of Area 2 revealed the locations of two large black features (Features 1 and 2) both of which contained large amounts of pottery fragments and small amounts of food debris. Further, this area was the area of highest sherd density for the whole site.

These features were excavated completely during the next two days. Many broken and reconstructable vessels were located in these features and repair of these was accomplished during the following year primarily under the direction of Marshall Williams. No additional features and no post molds were noted in the spring 1969 work. Despite the location of the two features, no further work was deemed necessary or warranted at the time. Further details of the two features will be given later.

As events developed, the site was spared destruction for the highway project. Sufficient fill dirt was obtained without destroying 9Mg28 and it was returned to unused pasture land for the next four years. No work was performed on the site during that time. In November of 1974, however, the site was retested as part of the site survey portion of the Georgia Power Wallace Reservoir project to see if other large features could be located. Testing at this time consisted of an additional eight scrapes made in the general portion of the site where the two features were found in 1969. No new features were found although a few apparent post molds were noted and marked (Wood: Personal Communication). At that point it was felt by the survey that the site had yielded its secrets and no further work was planned or anticipated.

In the early winter months of 1977 the site was revisited by the author and Marshall Williams. By now there were several road scraper trenches around the original features which had been exposed for up to eight years. The processes of exposure, rain, and frost had combined to make the upper soil in the exposed cuts very loose and easily shovel scraped. Scraping soon began uncovering obvious post molds in several areas, mostly around the features discovered in 1969. With volunteer help over the winter and early spring of 1977, it became apparent that the site still had good potential for yielding information on the late prehistoric inhabitants of the area. Some 160 posts of various diameters were located and mapped during the period. Additionally, new features were uncovered in the edges of some trenches. One of these (Feature 5) was a large pit filled with ceramics similar to those found years earlier. Also two features appeared to be the remained of burned and collapsed circular houses (Features 8 and 9).

Why these posts and new features should have become visible at that time and were not visible or noticed before is not certain. The prolonged period of exposure may have differentially oxidized the posts and the surrounding sterile red clay, although this is uncertain. The high moisture content of the soil in mid-winter aided contrasts and made faint color differences more noticeable. The application of water to the soil to aid in the process of reading the ground ultimately became an integral part of the later excavation of the site.

During the spring of 1977 final plans were underway at the University of Georgia for the upcoming excavation phase of the Wallace Reservoir project. The new discoveries at 9Mg28 reinstated it as a site which warranted further attention in the form of major excavations. Construction of a new, higher, railroad bridge and trestle began in the spring of 1977. The new tracks were to be located just south of the existing tracks and trestle (completed in 1838) and it was apparent that 9Mg28 was in immediate danger from the impending construction activities. In fact, the whole hill that 9Mg28 sat upon had been ear-marked for destruction as part of the project. Fortunately the construction team was able to alter their plans and not disturb the site. Unfortunately the area to the west of 9Mg28 that was destroyed instead turned out to be a fairly large Bell Phase site itself. Some two days salvage work was performed on this new and separate site designated 9Mg28-1 (Figure 4). This material has not been analyzed in detail, however, and is not reported here. It apparently is a different site, however, was separated from 9Mg28 by some 500 feet.

The major excavations on 9Mg28 took place from June 15, 1977, until September 16, 1977. The crew size varied with an average of about ten members. All field work was done under the direct supervision of the author. The work centered almost completely in the northern portion of the site adjacent to Area 2 where the features and posts had already been discovered. This part of the site was subsequently called the "main part of the site". This is better described as the major excavation on the Bell Phase component of the site. The first two weeks of work were centered on completing the excavation of known features and preparing the site for complete stripping. It had been decided that since there was no usable stratigraphic development on this eroded single component site that the best method for recovering the maximum amount of information in the minimum amount of time was to strip the entire plowzone away down to the sterile subsoil. All features and post molds present then could be systematically mapped and excavated.

In the early evening of July 5, 1977, the stripping was accomplished. A large 24 cubic yard earth mover was used to strip the topsoil away in successive parallel passes over the site. These were done in a northwest-southeast orientation, parallel to the river at the site. An area of almost two acres was opened up through this process. The topsoil was deposited some distance away from the site. Although the machine worked well, a few problems were encountered. First, windrows of dirt were left between each successive pass by the machine. This was removed in the following days through the use of a small farm tractor equipped with a scoop bucket on the front end. The small tractor also was of value in lowering portions of the site which were not taken quite deep enough by the large machine. The second problem caused by the large machine was the extreme compaction of the soil under its wheels. This made subsequent shovel scraping quite difficult in these linear strips (Plate 1).

A number of new features were immediately apparent after the clearing operations. These were concentrated in the portion of the site near where the earlier features had been located, north of Area 2. Time and

Plate 1 - Aerial View, Initial Excavations, 1977

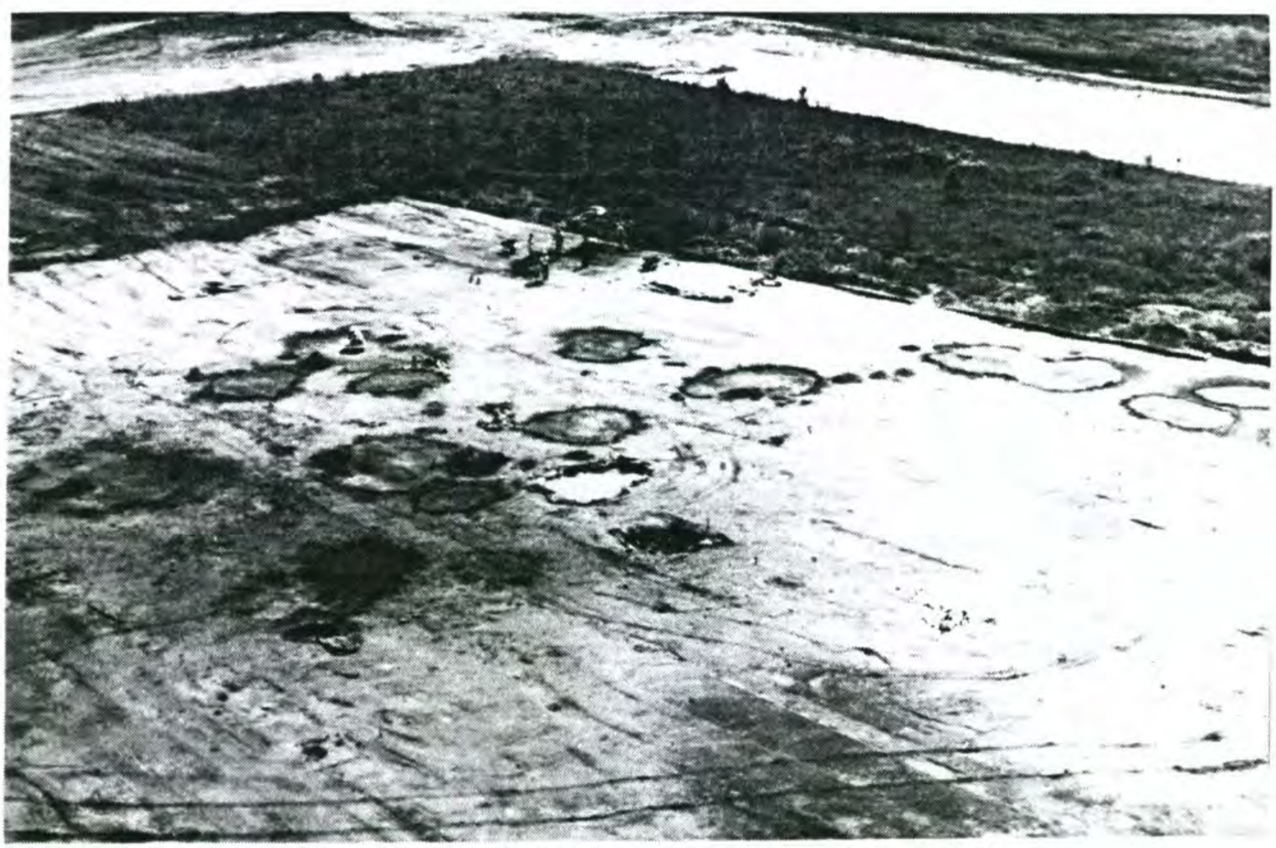


Plate 2 - Work in Progress, September, 1977

money limitations prevented the stripping of the entire hill top. Although a small amount of the Bell Phase village was apparently not uncovered in the southern portion of the site where the sand layers were the heaviest, the major portion was undoubtedly recovered. The major construction area just west of the site showed no features of any sort upon inspection after removal of the topsoil.

Following clearing operations a grid system was installed over the site creating a series of 50 foot square mapping units. It was decided to continue using English rather than metric units of measurement to provide continuity with the 1969 work. An arbitrary zero reference point was selected some distance to the south and west of the site, off the site itself. The grid itself was oriented $27^{\circ}$ 19' east of magnetic north paralleling the course of the Oconee River at this point. The grid was ultimately tied into the existing railroad bridge stone abutment as a fixed point of reference. Wooden stakes were used to mark the 50 foot units on the site. All features which showed immediate and obvious evidence of containing quantities of pottery or food debris were excavated at once, regardless of the location, to forestall possible problems from unauthorized intruders who might destroy the features through "pothunting" activities. Some damage to at least one feature some weeks earlier made this a very necessary move. Most excavated features were quartered, generally using the cardinal directions. Opposite quandrants were excavated first so that a total of four profiles were recorded before the last two quadrants were removed. This allowed for better understanding of the developmental history of each feature. Pollen, soil, and flotation samples were routinely taken from different levels in the excavated features.

Not all features were excavated, however, as the mapping of all features and posts was given priority. The majority of the last half of the season was used for these mapping operations. The general procedure used for each unit was as follows. Each entire 50 by 50 foot square was shovel scraped smooth. Posts and features were marked and numbered as they were located. While the crew doing the shovel scraping began another square, a small crew mapped the first square using a plane table and alidade. Running lists of post molds were kept. Diameters were measured and recorded. Each designated post mold was cored with a one inch diameter auger. Fill type and the depth at which sterile red clay was encountered were also recorded. Features were mapped in place along with the post molds.

The process of shovel scraping on a site stripped to bare red clay was not easy, particularly after several days exposure to the 100 degree plus temperatures and July sunlight. In fact, after just a few days the entire site was almost like concrete. It was necessary therefore to wet areas with water prior to scraping them. In order to facilitate this operation one of the large, deep features (Feature 9) previously excavated was converted into a reservoir. Water was pumped into it from the river for most of the day while a smaller pump was used on the site to pump water from the reservoir to the square about to be scraped and mapped. The technique worked well, but it was difficult to maintain gas driven pumps and hundreds of feet of garden hose and get them loaded and unloaded into vans each day. Short of rain, however, it was the only way to make the ground workable (Plate 2).

A total of ten complete and five partial squares were completed by the end of the formal field work on September 16. The area mapped amounted to almost exactly one acre. A few trips were made back to the site in the following year, with volunteers, to expand the work slightly. Approximately 80% of the area stripped by the heavy machinery was mapped. A little more could have been recovered with more time and money, but the largest portion of the village has been mapped. The final excavation map, Figure 50, is located in the back pocket of this report.

Because emphasis was placed on mapping as large an area as possible some trade-offs were inevitable. As mentioned before not all the features were excavated. In fact of the 55 feature numbers assigned, only 17 were completely excavated. A determined effort was made to excavate several of all types observed, however. These types will be described in the following chapter. A number of the unexcavated features were cored with a four inch diameter hand auger, however. Depth and fill type was recorded for these.

An additional trade-off was related to the post molds. Time did not permit the excavation of but a very few of these small features. No more than a handful of the 1100 numbered posts were excavated. It is readily admitted that a portion of the stains labeled here as post molds are in fact the remains of tree roots such as pine tree tap roots. How large the proportion is not known, but of the few that were excavated most were legitimate posts. Patterns formed by the posts are not common. I do not take this to mean that most of the stains are not posts however since this situation is common on most late sites. What patterns are apparent will be discussed later.

The remainder of this chapter will be used to describe the form only of the 55 features recorded at the site. Use, function, and meaning attributes of the features will be reserved for the next chapter where they will be discussed by form groups. The features are here discussed in numerical sequence only. This is done more for sake of convenience because references back to the forms of individual features will be common in the next chapter. The format and degree of detail given for the feature will vary depending on whether the feature was excavated or not and its degree of complexity. Horizontal plans and profiles for those which were excavated are included here. Reference to the main site map included in the back of this manuscript is encouraged. The only criterion for the assignment of feature numbers is when the feature was recognized. At recognition the next available number was assigned.

Feature 1

This was the first of the large features uncovered in 1969 through the early road scraper work. Ironically it produced more artifacts than any other feature on the entire site. The nearly circular feature measured 6.8 feet in diameter in the north-south direction and 6.6 feet in the east-west direction. It was located in Square 10 with its center at 225.5 north, 223 east. The total depth of fill was 1.88 feet. The fill consisted of large quantities of broken and fragmented pottery vessels mixed with quantities of black earth. Several burned logs were also found in place. Small quantities of bone and shell were included in the fill as well. Several fragments of clay pipes were also recovered. The overlapping nature of the large sherds throughout the fill made it impossible to excavate part of the feature so that a profile could be produced and recorded. There was no evidence of slow build up of material in the feature, however. The feature appears to have been filled in a very brief time. One small intact pottery bowl was located near the bottom of the feature. The empty pit had a complex shape apparently formed by placing a flat-bottomed circular pit into the southern portion of a larger shallow basin. This created a circular ledge or bench inside the feature. See the accompanying horizontal plan (Figure 5) and profile (Figure 6). Feature 1 appears to have been intrusive on the north-east edge of Feature 42.

A total of 62 vessel fragments were recognized from this feature. These ranged from the one intact, complete vessel, down to single unique rim sherds. Consideration of the use of the feature is taken up in the next chapter.

Feature 2

This feature was also discovered in 1969 along with Feature 1. Although this one was as large or larger than Feature 1 it lacked the center deep pit, its form having been a simple shallow basin. The feature was located just north of Squares 8 and 9 with the center at 355.5 North and 151.3 east. The surface exposure of midden was slightly elongated, the maximum east-west measurement being 8.3 feet (Figure 5). The north-south diameter was 6.2 feet. The major portion of the ceramics were from a smaller area near the center of the feature. The maximum depth at the center was only .7 feet, and this was off-center toward the northeast (Figure 7).

Although the feature had much less volume than Feature 1 a total of 16 vessel fragments, some of large size, were recovered. Small quantities of animal bone were also recovered. The fill of Feature 2 had a higher percentage of grey ash than Feature 1 and no burned logs were noted. It appears to have been intrusive into the northwest edge of Feature 48.

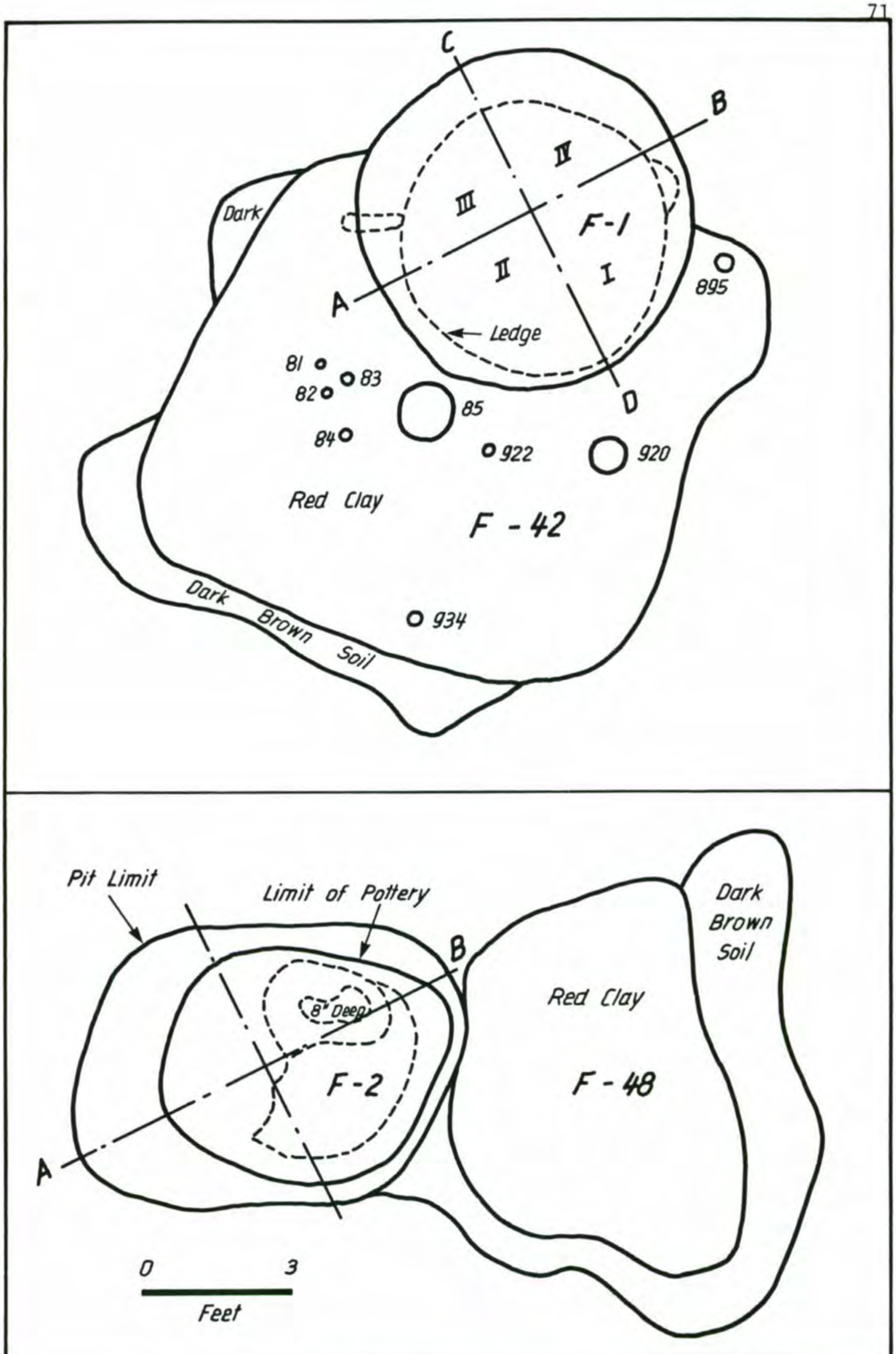

C
B
IV
III
F-1
II
I
A
895
Dark
Ledge
D
81
82
83
84
85
922
920
Red Clay
F - 42
Dark Brown Soil
934
Pit Limit
Limit of Pottery
B
8" Deep
Red Clay
Dark Brown Soil
F-2
F - 48
A
0
3
Feet

Figure 5

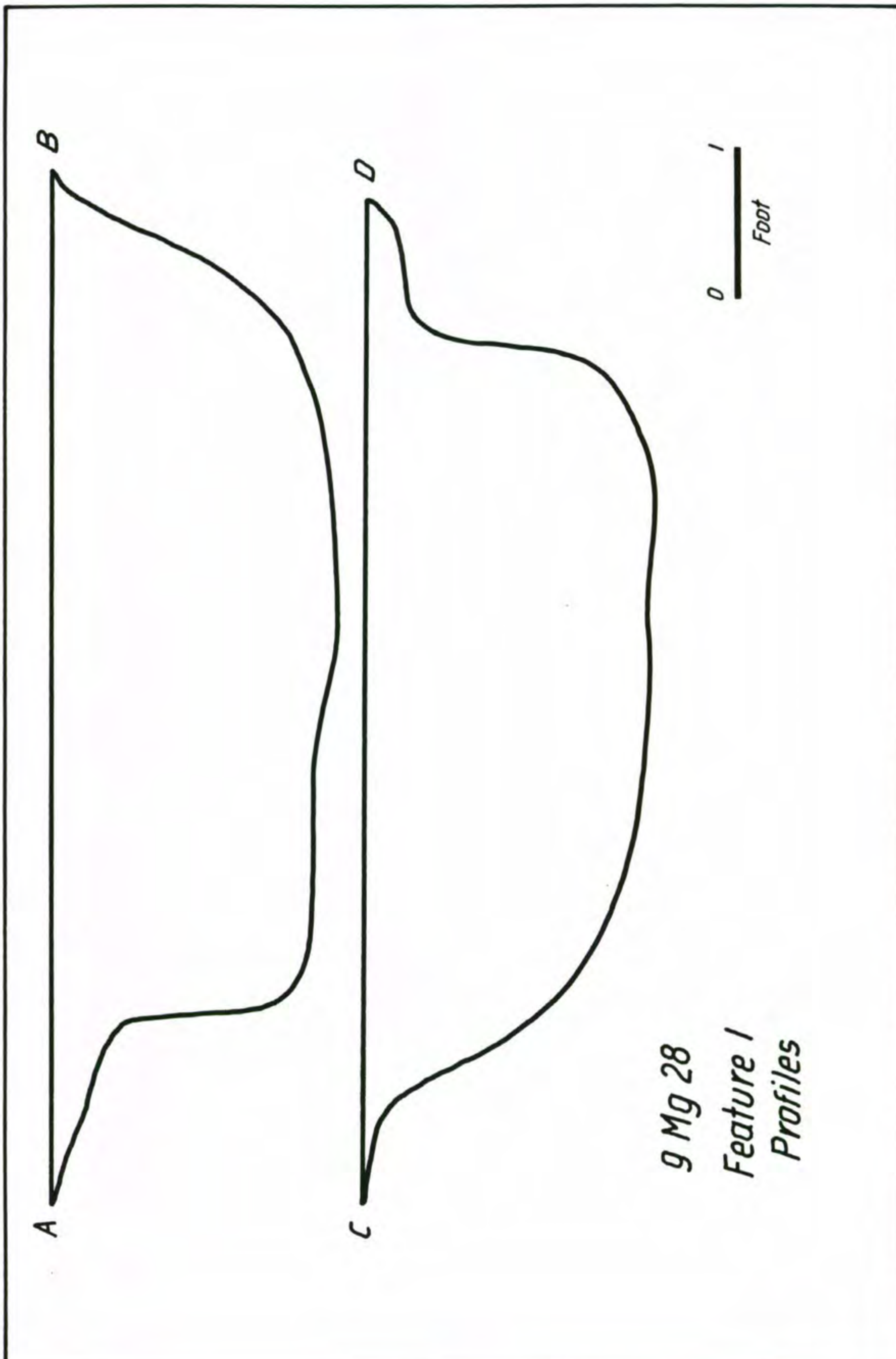



Figure 6

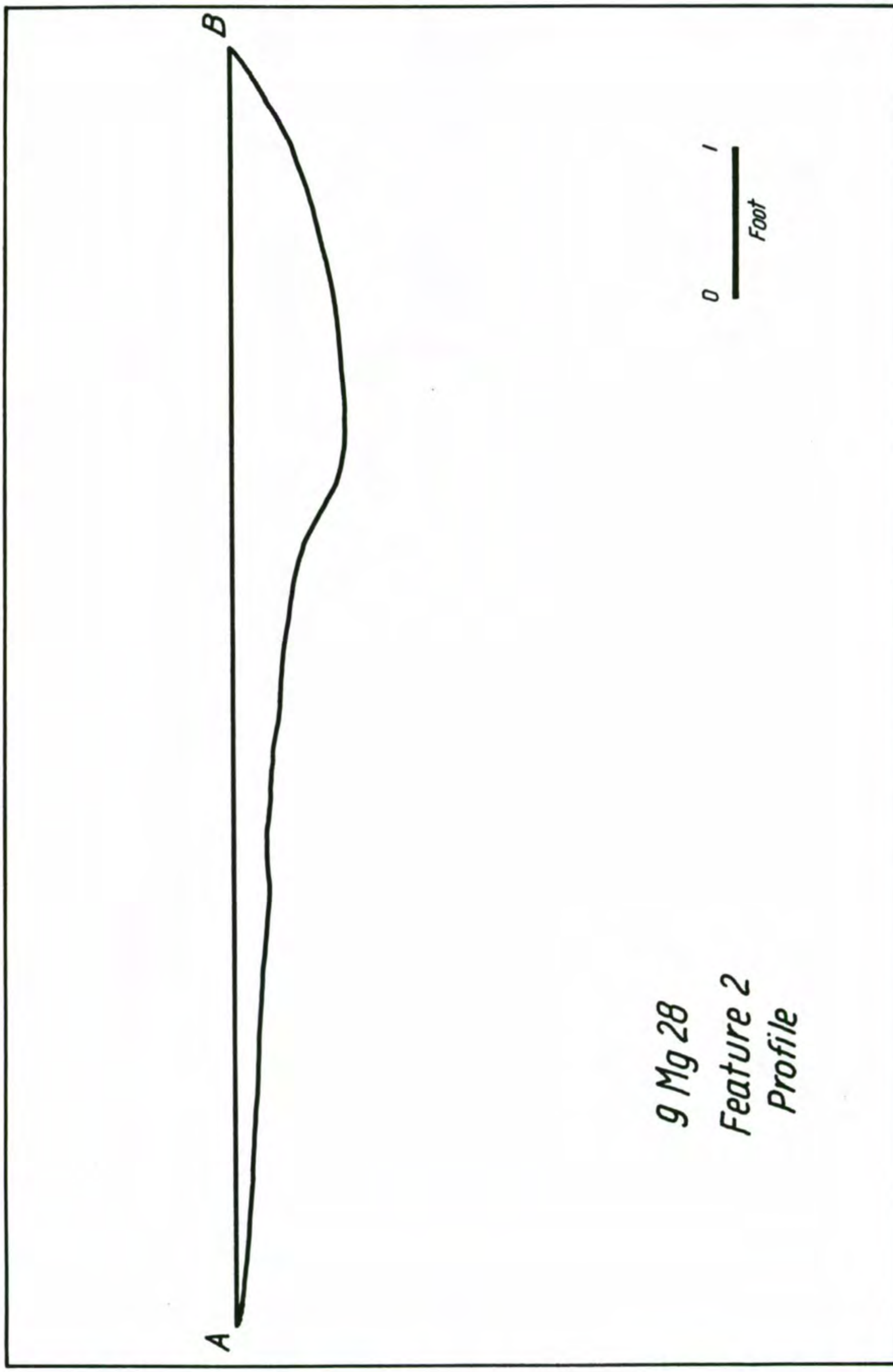



Figure 7

Feature 3

First located in the early months of 1977 this feature consisted of an oval area 4.3 feet north-south (grid) by 3.4 feet east-west (grid) (Figure 8). The fill appeared to be a fairly homogenous dark brown soil with no evidence of artifacts on the surface. The exact location was in Square 9 centered at 335.4 north and 183.7 east. Although time did not permit its excavation during the 1977 summer work, it was partially excavated in 1979 just before innundation. No artifacts or cultural materials of any sort were noted. The depth was at least 1.5 feet and the fill type was uniform throughout. The feature was intrusive on the southeast edge of Feature 7.

Feature 4

Located in the west center part of Square 10 at 322.5 north and 203.2 east this small oval feature was similar to Feature 3 just described. The diameter in the east-west direction was 3.2 feet while the north-south dimension was 1.8 feet (Figure 8). The fill was also a dark brown loam. Feature 4 was never excavated. No artifacts were noted on its surface. It was almost directly adjacent to Feature 11, however, and the two may have been related to some larger feature, but this is unsure.

Feature 5

Located in the spring of 1977 this large feature appeared similar to Feature 1 at first glance. The feature was an almost perfect circle, 8.2 feet in diameter and with a black fill which had sherds, shells, and bone exposed in the top (Figure 8). The feature was in the north center part of Square 9 centered at 339 north and 172.3 east. Excavation began in the spring of 1977 and was completed in the early summer. The basic

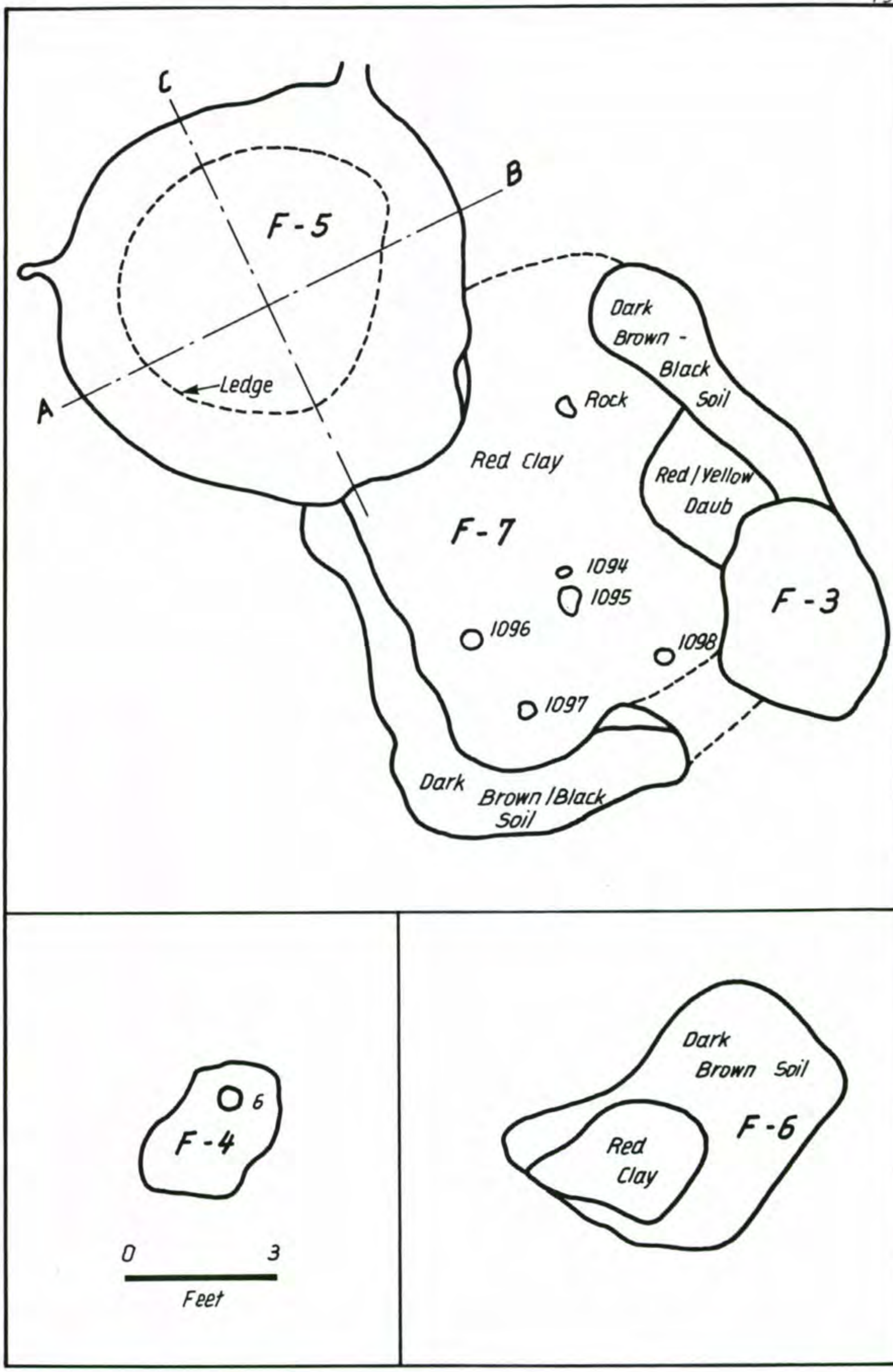

C
B
F - 5
A
Ledge
Dark
Brown -
Black
Soil
Rock
Red Clay
Red / Yellow
Daub
F - 7
F - 3
1094
1095
1096
1098
1097
Dark
Brown / Black
Soil
Dark
Brown Soil
6
F - 4
Red
Clay
F - 6
0
3
Feet

Figure 8

excavation plan was to divide the feature into four quadrants along the cardinal directions. The northwest and southeast quadrants were removed first. These were excavated in one foot squares by natural levels as they were encountered. The total depth was 2.1 feet. The four profiles revealed following the removal of the first two quadrants were recorded and used to guide excavation of the remaining two quadrants. The profiles as seen here show a very complex development (Figure 9). The layers consisted of alternating deposits of red-brown loam, black midden, and ash lenses of a wide variety. A layer of coarse sand was also included. The general picture was one of gradual build up by the deposition of several types of fill over some time. Fairly large quantities of vessel fragments, bones, and plant remains were recovered. Ultimately all of the fill was water screened through window screens. The pit shape was almost identical to that of Feature 1 - that is a shallow basin with a circular, flat bottomed pit in the middle, again creating the ledge or bench effect. A total of 29 numbered vessel fragments were recovered from Feature 5. Attempts were made to segregate the various levels within the feature based upon cross-mends of sherds within and between levels. This information is discussed with the vessel analysis section later. Feature 5 was intrusive on the north edge of Feature 7. The top of the feature had been slightly damaged by plowing as had most other features.

Feature 6

Located in Square 9 just north of Features 4, 5, and 7 the exact location of this feature was 326.1 north and 183.5 east. The shape was that of an irregular oval 6.8 feet east to west and 5.4 feet north to

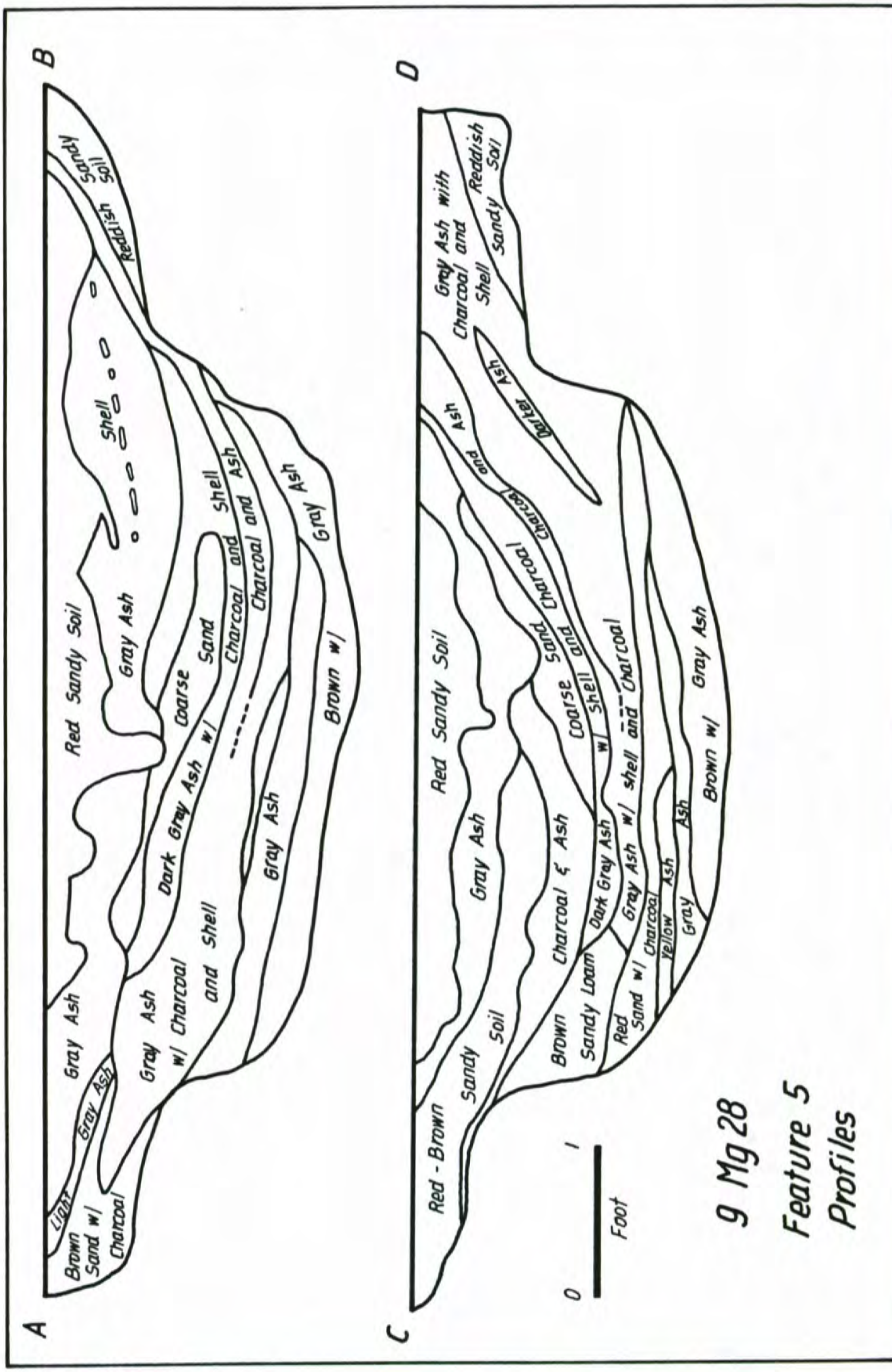

A
B
C
D
9 Mg 28
Feature 5
Profiles
0
1
Foot
Red Sandy Soil
Gray Ash
Shell
Coarse Sand
Dark Gray Ash w/
Charcoal and Shell
Charcoal and Ash
Brown w/ Gray Ash
Gray Ash w/ Charcoal and Shell
Brown Sand w/ Charcoal
Light Gray Ash
Sandy Soil
Reddish Soil
Red - Brown Sandy Soil
Gray Ash with Charcoal and Shell
Reddish Sandy Soil
Darker Ash
Charcoal and Ash
Charcoal & Ash
Sand Charcoal
Brown Sandy Loam
Dark Gray Ash
Red Sand w/ Charcoal
Yellow Ash
Gray Ash
Coarse Sand w/ Shell and Charcoal
Gray Ash w/ shell and Charcoal
Brown w/ Gray Ash

Figure 9

south. The major portion of this oval was a formed from a dark brown loamy soil. The western portion of the oval had a smaller (3.5 feet by 2.5 feet) patch of bright red clay included in it. No artifacts were noted on the surface of the feature and it was not excavated. It's proximity to Feature 7 may imply a related use but this is uncertain (Figure 8).

Feature 7

This feature, which was discovered along with Features 3 and 5 in the late winter of 1977, consisted of at least three distinct parts. The center and largest portion of the feature was a roughly circular area of bright red clay about seven feet in diameter (Figure 8). On the western, southern, and eastern sides the bright red area was surrounded by linear areas of dark brown-black soil which averaged just over one foot wide. At the interface of the red clay and the black ring on the eastern side of the feature was a pile of red-yellow baked clay fragments each with wood impressions. The pile was almost three feet in diameter. Feature 3 was intrusive on the entire features' southeast corner, while Feature 5 intruded on the northwest corner. Five smaller circular stains, possible post molds intruded the middle red clay section of the feature A large (Ca. 8 inch) quartz rock was present on the surface of the bright red clay near the northern portion of the center red clay. It should be pointed out that the center red clay of this feature was much a brighter and deeper red than the sterile red subsoil surrounding this and all other features. No artifacts were noted on the surface of Feature 7 and it was not excavated. One auger test was placed near the center of the feature, however, and a black layer was reached 1.7 feet below the surface just above sterile earth.

Feature 8

Feature 8 was discovered in the early spring of 1977 in the end of one of the 1974 road scraper cuts to the south of the area of the previous features. Its actual location was in the northeast corner of Square 6, centered at 298.3 north and 195.7 east. The feature was slightly greater in diameter in the north-south direction, although it was nearly circular (Figure 10). The north-south dimension was 10.8 feet while the east-west was 9.2 feet. The total depth following excavation was 2.4 feet. The major portion of the exposed surface of the feature consisted of bright red clay which had occasional pieces of fired clay near the center. Surrounding the southern half of the feature, and taking up most of the exposed northern half of the feature was a dark brown humus. It appeared that plowing had removed much of the apparently overlying red center portion on the northern half. Four possible post molds intruded the feature near its edges.

Some preliminary testing of the feature took place prior to the full scale scraping of the site. Final excavation, however, consisted of dividing the feature into four quadrants and excavating alternate ones beginning with the southeast quadrant. The red clay in the center was removed first, and then the dark brown layer was excavated. The basic form of the feature was unanticipated. The dark layer formed a fairly thin layer over the bottom and sides of the bowl shaped depression (Figure 11). The red clay formed the major portion of the volume of the feature, being contained in the shell of the thin dark brown

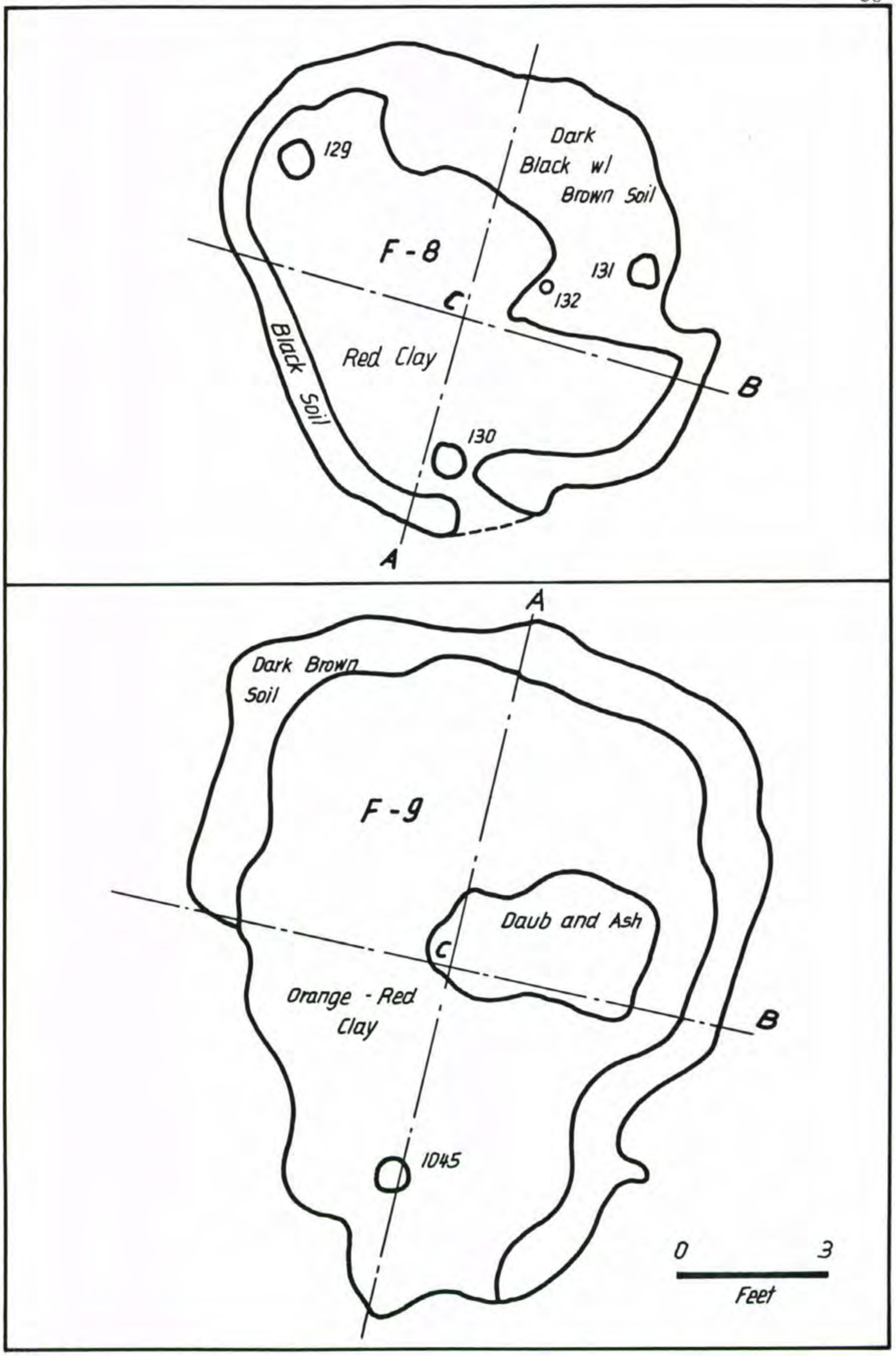

129
Dark
Black w/
Brown Soil
F - 8
131
132
C
Black Soil
Red Clay
B
130
A
A
Dark Brown
Soil
F - 9
Daub and Ash
C
Orange - Red
Clay
B
1045
0
3
Feet

Figure 10

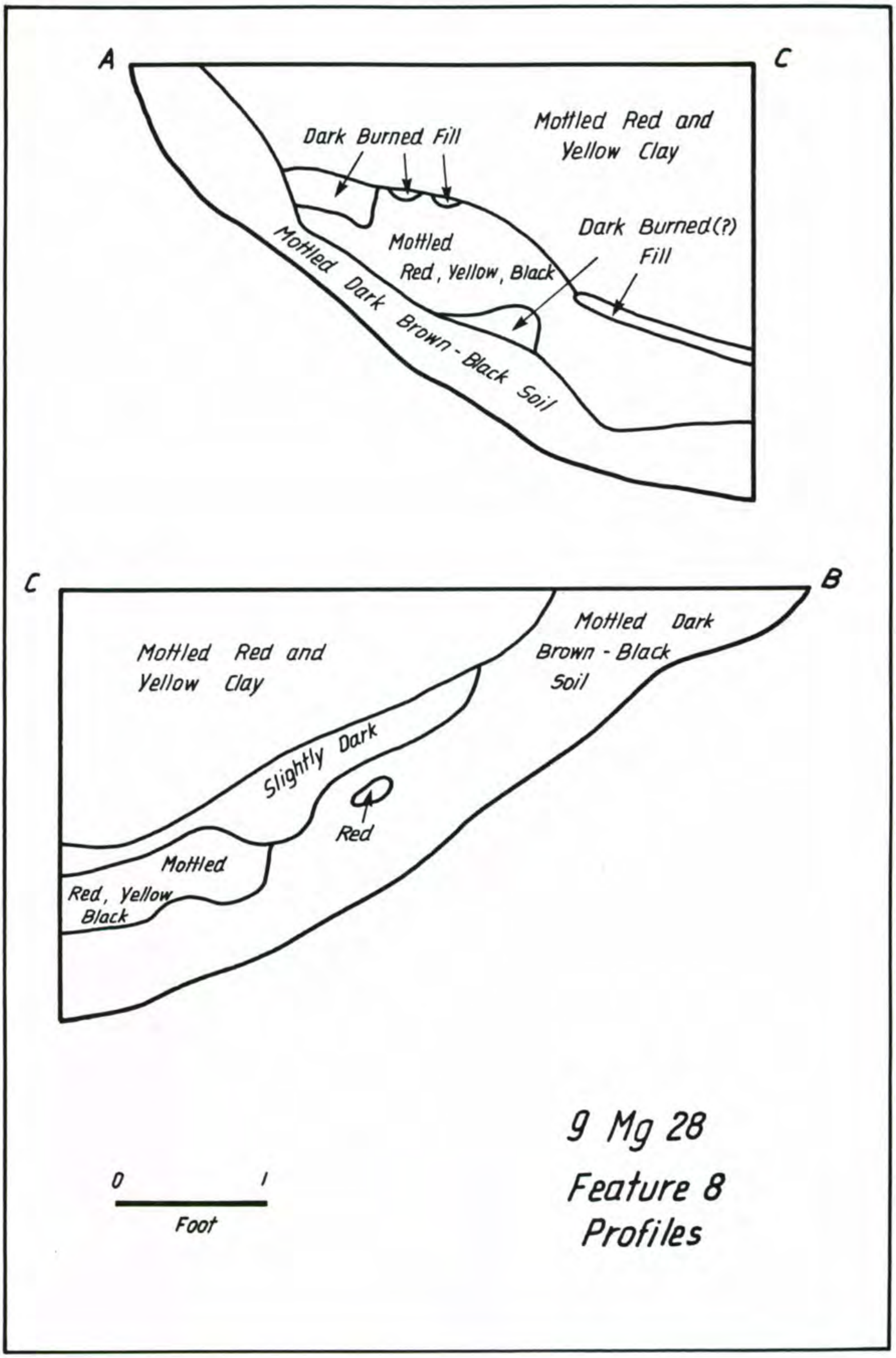

A
C
Dark Burned Fill
Mottled Red and
Yellow Clay
Mottled
Red, Yellow, Black
Dark Burned(?)
Fill
Mottled Dark Brown - Black Soil
C
B
Mottled Red and
Yellow Clay
Mottled Dark
Brown - Black
Soil
Slightly Dark
Red
Mottled
Red, Yellow
Black
0
1
Foot
9 Mg 28
Feature 8
Profiles

Figure 11

layer. There was mild to moderate mixing of the two fills at their junction near the bottom of the feature. Moderate amounts of fine charcoal was included with the dark fill near the bottom.

There were practically no artifacts found in the feature. The only thing found consisted of a few lithic items located in the dark soil in the bottom of the feature. Nothing was found in the red clay at all (except baked clay fragments with wood impressions found near the top). The artifacts found consist of two unidentified pieces of chipping debris (one light chert and one partial cortical quartz), one quartz retouch flake, and one quartz cordiform biface tool.

It was later recognized that Feature 8 was intrusive into Feature 43 on the latters southwest corner. At least two of the "post molds" went completely through the feature into the sterile soil beneath. It is not certain if they are associated with the feature or later intrusions through it.

Feature 9

Located just west of Feature 8 was Feature 9. It was discovered at the same time as Feature 8 in the spring of 1977. In the northern center of Square 6, its exact center was at 292.5 north and 180.6 east. It was only partially uncovered prior to the major site clearing in early July. The final exposure of the feature showed it to be one of the largest on the site (Figure 10). The larger north-south dimension of this oval feature was 14.2 feet while the shorter east-west diameter was 11.0 feet. The surface form of the feature consisted of a large bright red center portion almost completely surrounded by a dark brown ring which averaged one foot wide. Additionally a large (4 feet by 2.5

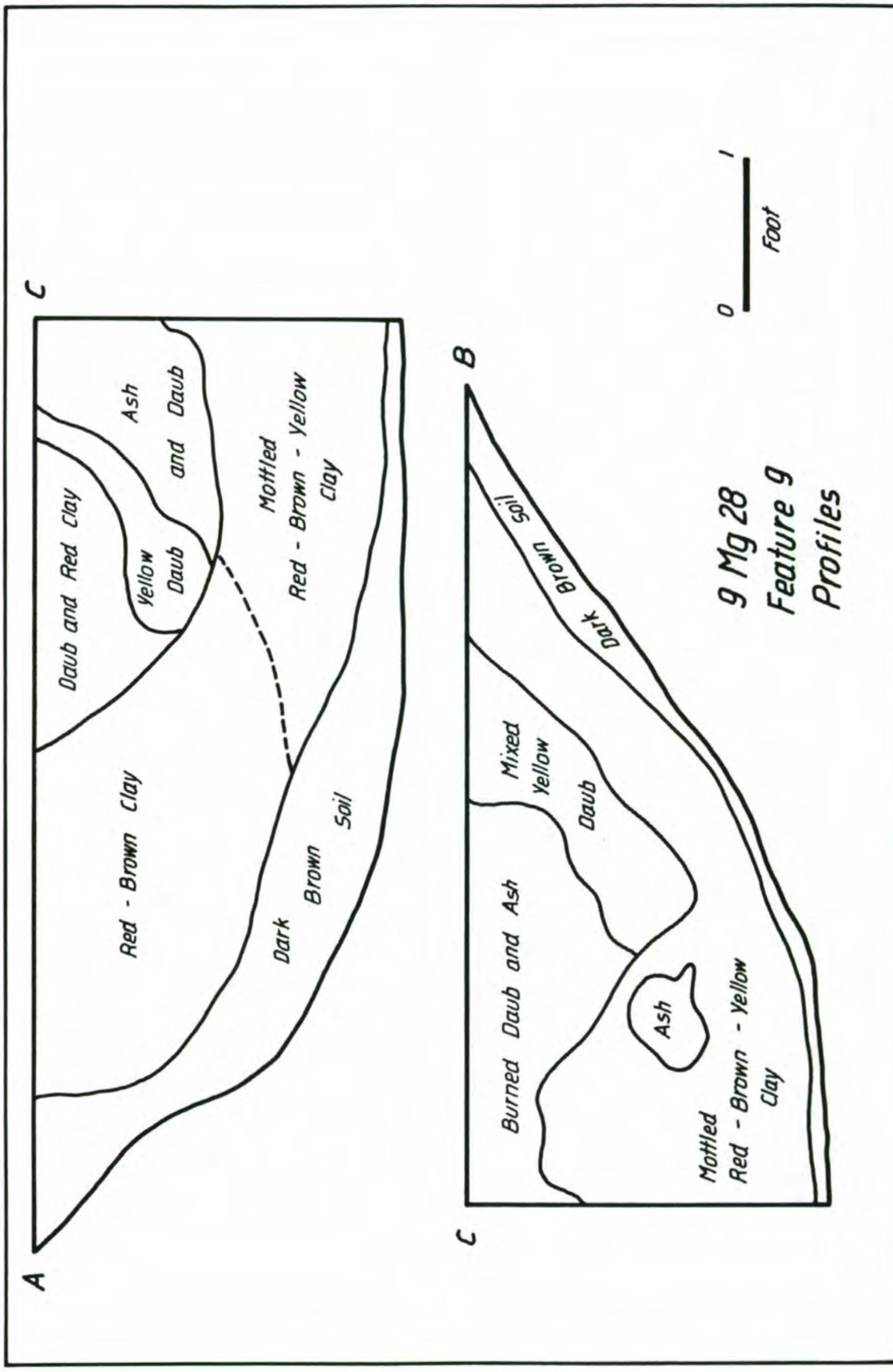

A
C
Daub and Red Clay
Yellow Daub
Ash and Daub
Mottled Red - Brown - Yellow Clay
Red - Brown Clay
Dark Brown Soil
C
B
Dark Brown Soil
Mixed Yellow Daub
Burned Daub and Ash
Ash
Mottled Red - Brown - Yellow Clay
9 Mg 28
Feature 9
Profiles
0
1
Foot

Figure 12

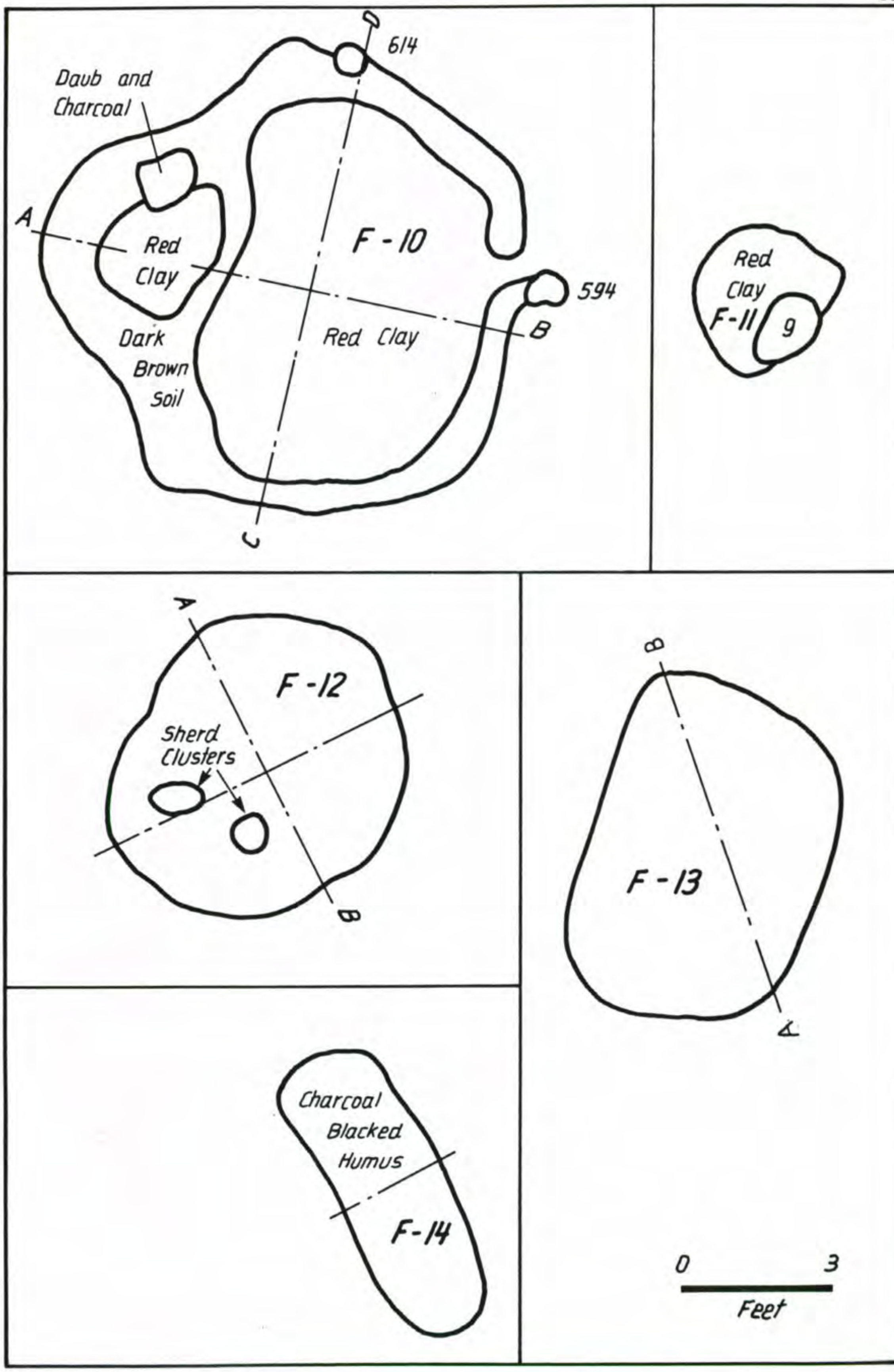
feet) area of fired clay lumps and ash was present near the center of the feature. Three small circular "post mold" stains were also present on the surface. No artifacts were visible on the surface of the feature.

Excavation proceeded in the usual manner of dividing the feature into quadrants using grid north-south and excavating alternate quarters beginning with the southeast one. The profiles revealed a development somewhat similar to that of Feature 8 just described above (Figure 12). The total depth of the feature was found to be 2.4 feet below the top. The dark layer was quite thin on the bottom of this feature, in places no more than an inch. There was a much greater amount of fired clay in the center of the fill than in Feature 8. Additionally a couple of large (Ca. 8 inch) quartz blocks were found in the red fill forming the body of the feature.

Artifacts were almost as rare in Feature 9 as they had been in Feature 8. A total of 22 pieces of unidentified quartz chipping debris and five pieces of unidentified light colored chert chipping debris were recovered. Nine retouch flakes, two of light colored chert and the rest of quartz, were found. Two percussion flakes, and one unifacial tool, all of quartz, were also located. Most of these were found in the thin, dark fill at the bottom of the feature.

Feature 10

This feature, located in the late spring of 1977, was just northwest and adjacent to Feature 9. It was in the middle of one of the 1974 road-scraper cuts, but was not readily apparent. It certainly was not as clearly visible as Features 7, 8 or 9. It was located in Squares 6 and 9 of the 50 foot site grid. The center was located at 301.7 north



614
Daub and Charcoal
A
Red Clay
F - 10
594
Red Clay
B
Dark Brown Soil
C
Red Clay
F-11
9
A
F -12
Sherd Clusters
B
B
F - 13
A
Charcoal Blacked Humus
F - 14
0
3
Feet


Figure 13

and 162.2 east. The feature was a nearly circular one with an inner section of bright red clay surrounded by a ring of brown soil (Figure 13). A pile of fired clay about one foot in diameter was located atop the feature in the northwest portion of it. The north-south and east-west diameters were 9.3 and 9.2 feet respectively. The maximum depth after excavation was 2.8 feet. The form of the feature was one of a thin shell of brown-black humus lining the features, with the center being filled with red clay (Figure 14). The brown was thinnest towards the center and thicker near the sides. The fired clay pile was confined to the upper portions of the feature. Artifacts recovered from the brown bottom layer include one quartz retouch flake and one lanceolate biface, also made of quartz.

Feature 11

This was a small area of mixed black humus and fired red clay lumps. It was located just northwest of Feature 4 in the eastern edge of Square 10. The center is at 323.3 north and 200.9 east. The slightly elongated feature was 3.1 feet in diameter north to south and 2.9 feet in diameter east to west (Feature 13). It was not excavated and no artifacts were noted on its surface. Its proximity to Feature 4 may indicate that these are both part of a larger feature, but this is unsure. It should be noted that the area immediately around Features 4 and 11 was heavily compressed by the tired of the earth mover and was subsequently difficult to "read".

Feature 12

This, and all subsequent features were not located until after the major stripping operations of early July, 1977. This particular one was

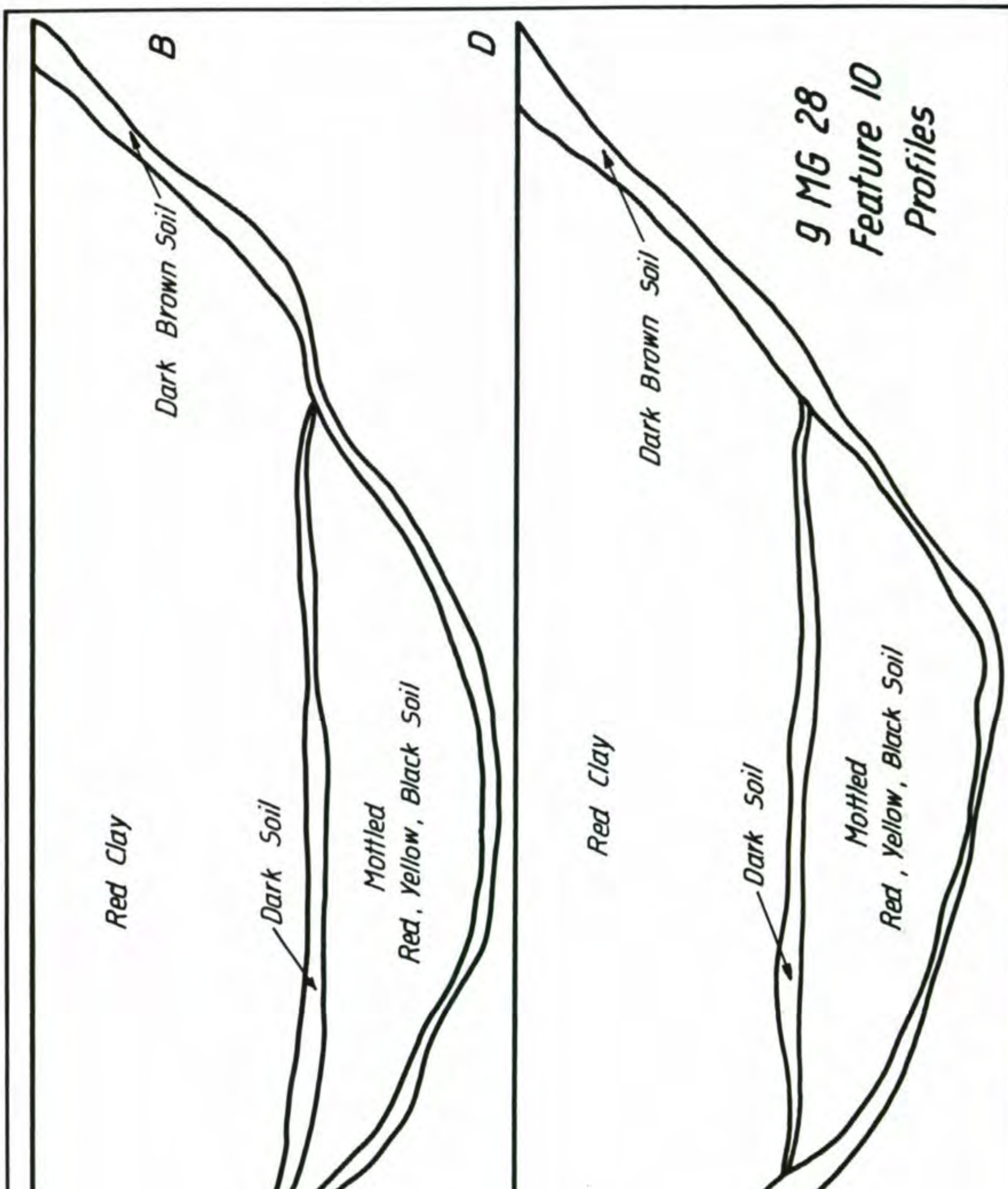

A
B
C
D
Dark Brown Soil
Red Clay
Dark Soil
Mottled
Red, Yellow, Black Soil
9 MG 28
Feature 10
Profiles
0
1
Foot

Figure 14

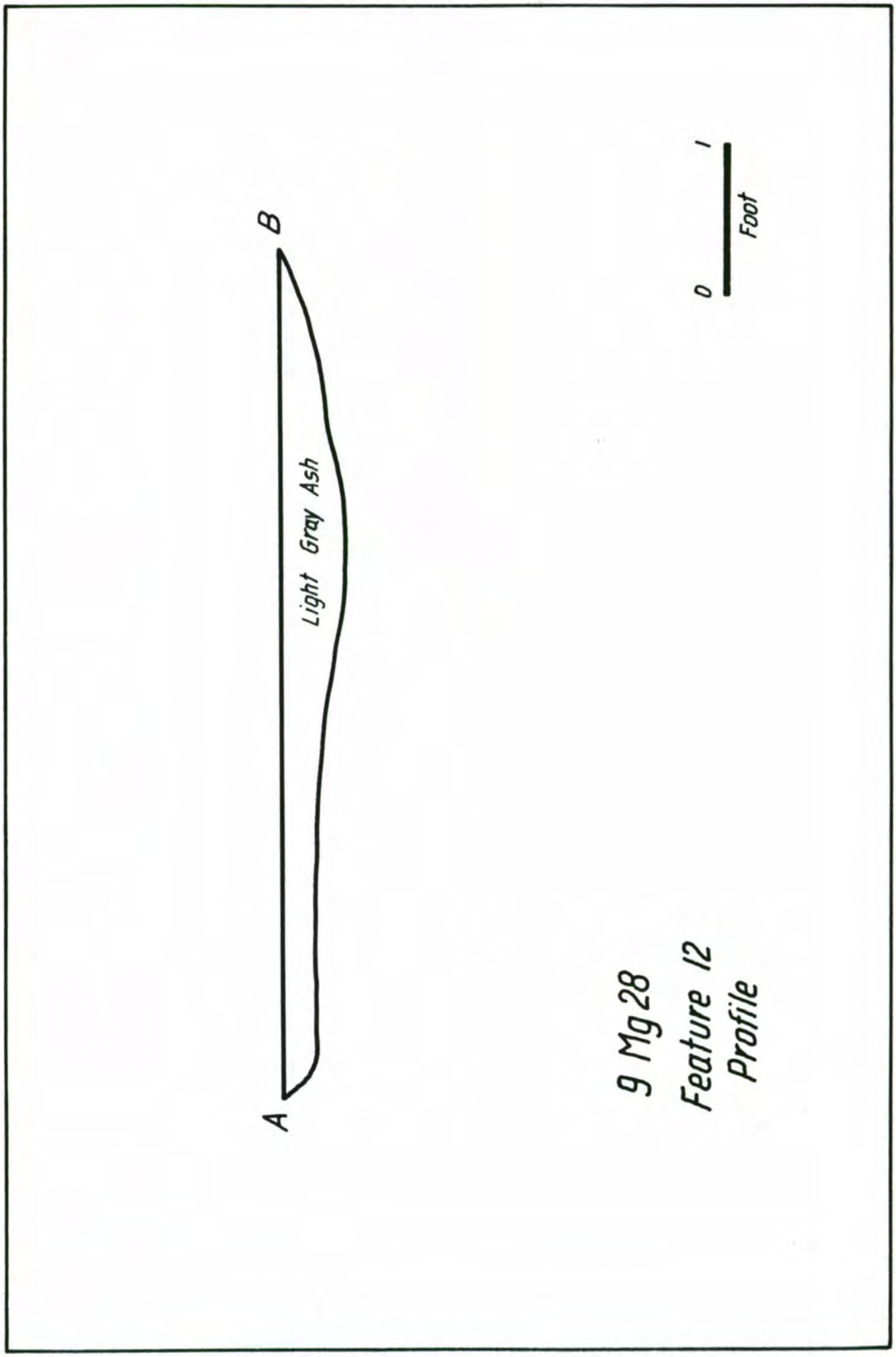



Figure 15

located between Squares 7 and 8 at 301.3 north and 125 east. The form was fairly simple, consisting of a nearly circular patch of light grey ash in the sterile red clay (Figure 13). The north-south diameter was 5.6 feet and the east-west diameter was 6.1 feet. The feature was excavated in four quadrants laid out with the cardinal directions. The southwest quadrant was excavated first and followed by the northeast, northwest, and southeast quadrants. The cross-sectional form was one of a shallow basin with a maximum depth of only .45 feet (Figure 15). There was no clear evidence of the fill having been accomplished over anything but a short period of time. Fragments of one vessel were found in two separate clusters in the southwest and northwest quadrants. A few other sherds not assignable to the one reconstructable vessel were also located. A few pieces of fire cracked rock and one quartz percussion flake were included. Some 300 animal bones were also located. These are discussed under the section on diet. The only feature near Feature 12 is Feature 39 just to the south.

Feature 13

Features 13 and 14 are not located on the major grided portion of 9Mg28, but are in a bulldozed area some 500 feet to the southeast and just north of Area 1 (see Figure 4). They are, in fact, associated with the Duvall Phase occupation from which the flood redeposited materials in Area 1 were derived. Feature 13 was a large oval feature whose maximum length was 7.3 feet (north-south) and minimum which was 5.0 feet (east-west) (Figure 13). The feature was completely excavated and was found to have a maximum depth of 1.4 feet. The fill consisted of at least seven layers which alternated between layers of ashy-charcoal midden and red

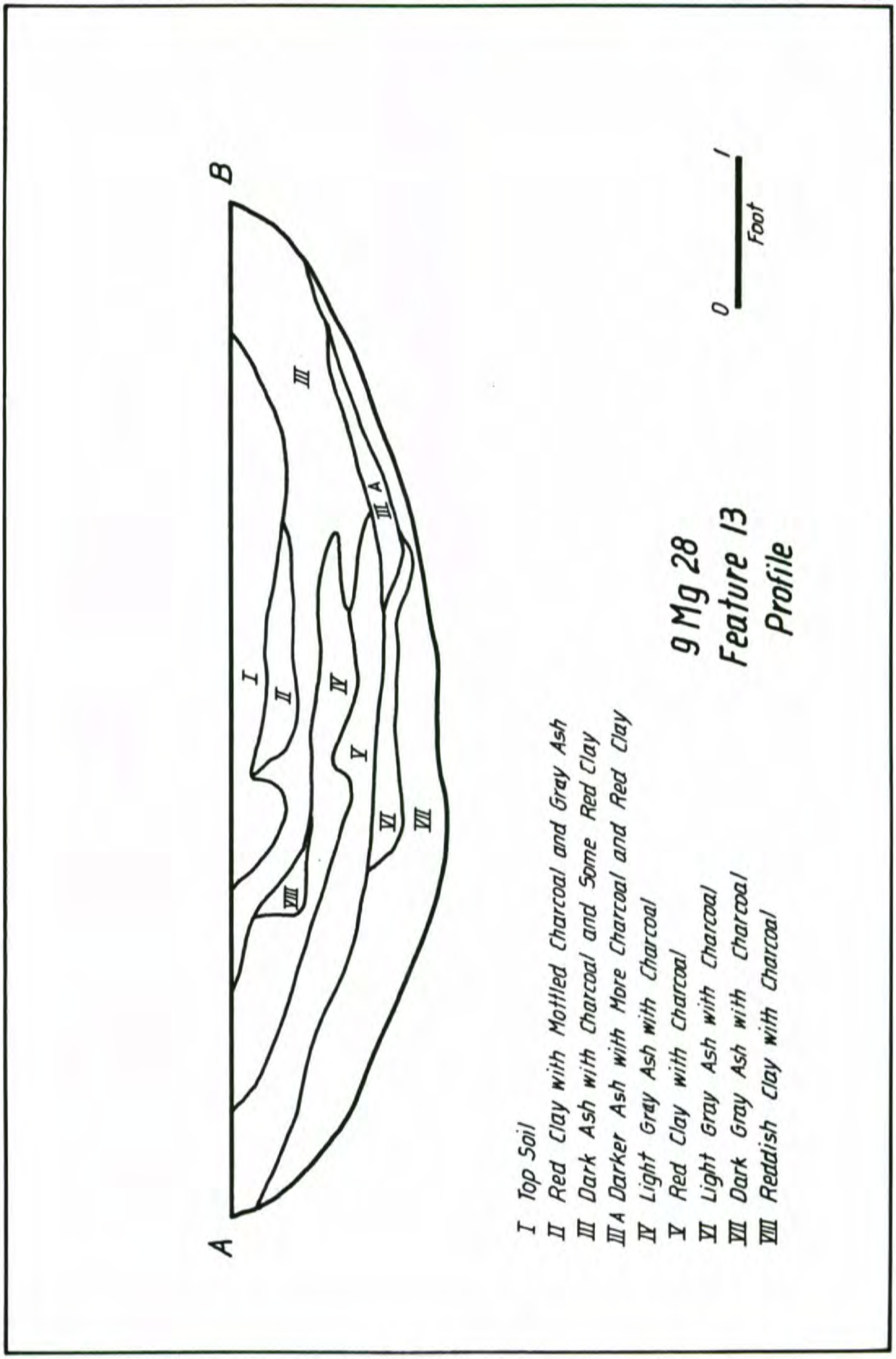

A
B
I
II
III
III A
IV
V
VI
VII
VIII
9 Mg 28
Feature 13
Profile
0
1
Foot
I Top Soil
II Red Clay with Mottled Charcoal and Gray Ash
III Dark Ash with Charcoal and Some Red Clay
III A Darker Ash with More Charcoal and Red Clay
IV Light Gray Ash with Charcoal
V Red Clay with Charcoal
VI Light Gray Ash with Charcoal
VII Dark Gray Ash with Charcoal
VIII Reddish Clay with Charcoal

Figure 16

clay with charcoal (Figure 16). The stratigraphy indicates a gradual accumulation over time. At least one of the red clay levels appeared as a "false bottom" to the feature. Whether this was intentional or not is unknown. The overall shape of the pit was that of a simple bowl.

The feature had large quantities of pottery virtually all of which is of Duvall Phase. Additionally, a large sample of animal bone was recovered, much of very small size. Most of the fill was water-screened through window screen size mesh. In fact this probably is one of the best samples of pure Duvall Phase animal bone recovered from the Wallace Reservoir Project area. Its importance for this report, which centers on Bell Phase, is minimal however.

Feature 14

Located about 50 feet north of Feature 13 as described above, this feature was recognized as an elongated or rectangular pit with a brown humus fill. The maximum north-south dimension was 6.2 feet and the minimum east-west diameter was 2.1 feet (Figure 13). The feature showed no artifacts on the surface. The southern half of the feature was excavated in anticipation of a possible historic human burial. Nothing was located in the fill or bottom of the straight wall feature. Probable root molds in the bottom made it likely that the feature is of non-human origin. No artifacts of any sort were recovered and the feature was abandoned without testing the northern half.

Feature 15

This feature was located in the southeast corner of Square 6 and centered at 256.3 north and 188.6 east. The form was of a circular black stain slightly elongated in the north-south direction (Figure 17). The north-south diameter was 7.0 feet and the east-west dimension was 6.2 feet. Following excavation the maximum depth of the bowl shaped, flat bottomed feature was 1.5 feet. Moderate amounts of broken pottery and animal bone werevisible on the surface of the feature.

Excavation was carried out by quadrants laid out to the cardinal directions. The southwest quadrant was excavated first, followed by the northeast. The four profiles thus exposed revealed a pattern of alternating levels of ash, charcoal, midden, and brown soil with fired clay inclusions (Figure 18). The general nature of the accumulation of debris is similar in several respects to that of Feature 5.

In the very bottom, particularly in the northeast quadrant were a series of clustered sherds, partial vessel fragments broken in place. A total of six reconstructable vessels were recovered from the feature, almost all from this bottom layer. One pottery disc, 8 quartz retouch flakes, one quartz percussion flake, and 23 fragments of quartz chipping debris were recovered. Some 225 bones of various types were also found in the fill of the feature.

Feature 15 was intrusive on the northwest edge of Feature 16. Large samples, but not all, of the fill were processed through window screen with water to facilitate fine recovery.

Feature 16

As just noted, Feature 16 is intruded on its northwest side by Feature 15. The center location of Feature 16 is 247.9 north and 188.6 east. This places the feature in both Squares 3 and 6. The long axis of Feature 16 is 17.2 feet long in a northeast-southwest grid direction

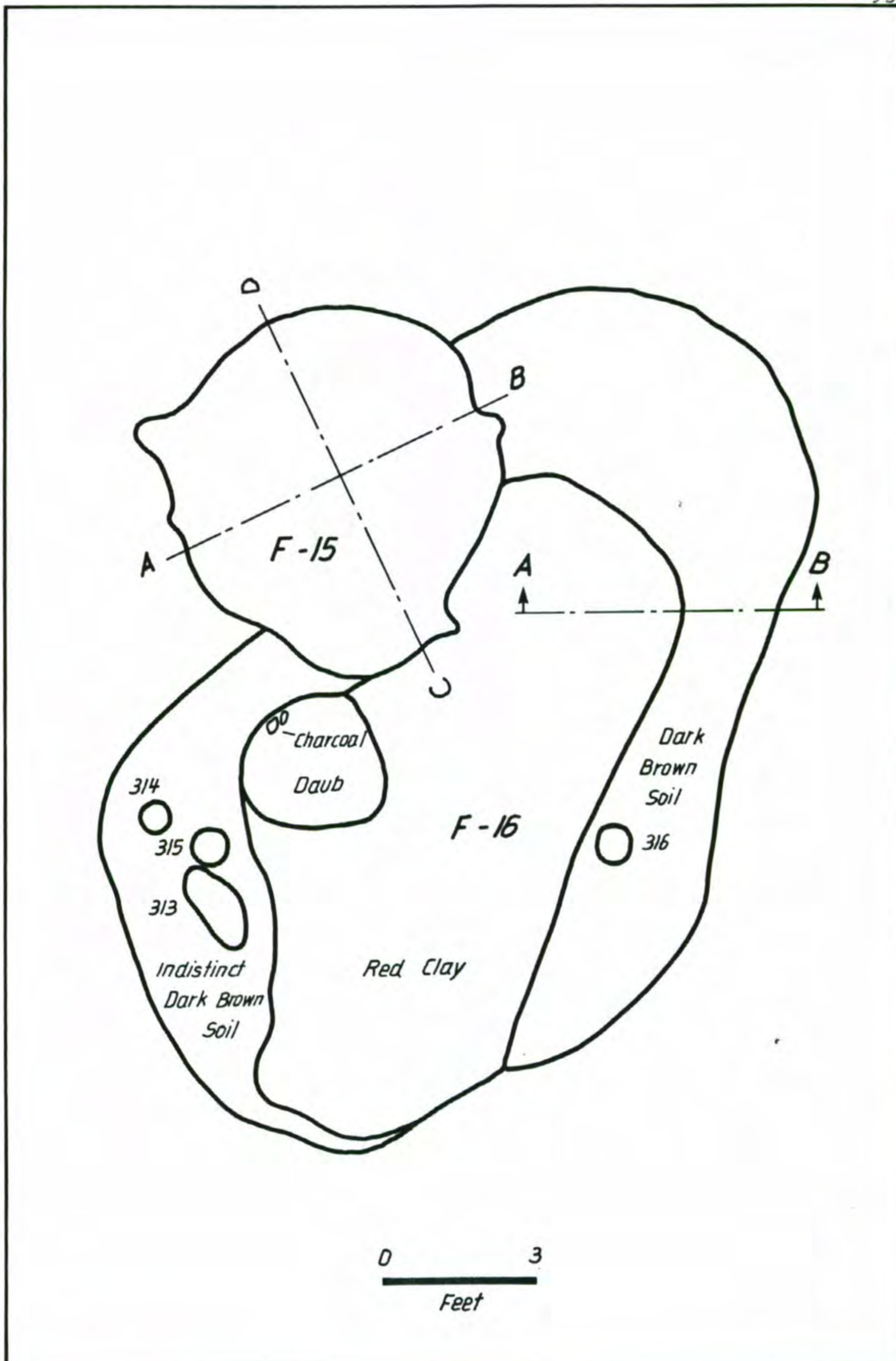

D
B
A
F - 15
C
A
B
Charcoal
Daub
314
315
313
F - 16
316
Dark
Brown
Soil
Indistinct
Dark Brown
Soil
Red Clay
0
3
Feet

Figure 17

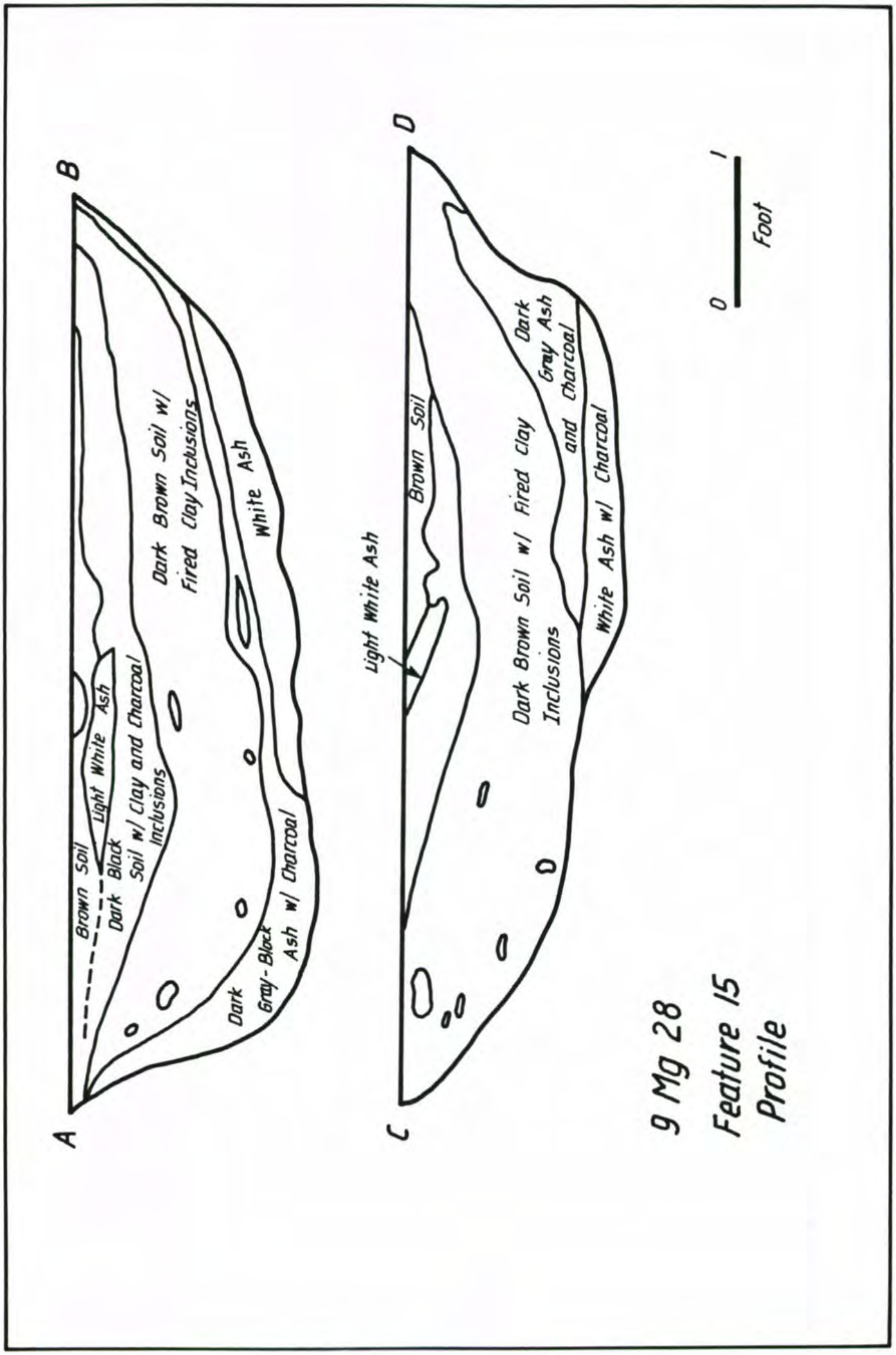

A
B
C
D
Brown Soil
Dark Black Soil w/ Clay and Charcoal Inclusions
Light White Ash
Dark Brown Soil w/ Fired Clay Inclusions
White Ash
Dark Gray-Black Ash w/ Charcoal
Light White Ash
Brown Soil
Dark Brown Soil w/ Fired Clay Inclusions
Dark Gray Ash and Charcoal
White Ash w/ Charcoal
0
1
Foot
9 Mg 28
Feature 15
Profile

Figure 18

while the width is a maximum of 12.0 feet in the grid east-west direction. The surface form of the feature is that of a large bright red clay center area surrounded by a fairly wide but variable ring of dark brown humus (Figure 17). A three foot diameter pile of fired clay with charcoal flecks was located at the west center portion of the feature and at least four post molds intrude into the brown humus of the feature. No artifacts were noted on the surface of the feature. A three inch diameter auger test near the center made in the late summer of 1977 showed the depth to be at least 2.8 feet. No further excavations were undertaken at that time.

In June of 1979 just prior to inundation, however, a trench approximately six feet by four feet was placed into the eastern portion of the center of the feature. These excavations were done with volunteer labor only. The pit was taken into sterile clay so a profile including the entire pit and lining could be inspected (Figure 19). No artifacts were found in the test. At the deepest point the feature was 3.2 feet deep. The red clay center fill reached a depth of 2.9 feet and a thin layer of dark brown-black humus was just at the base of the feature. The black humus was thin at the center bottom, got thicker toward the edge of the bottom, thinned almost completely away on the steep side wall, and became thick again on the top outside edge of the feature.

Samples of the fired clay were collected and showed many impressions of what are apparently small logs.

Feature 17

This feature was located near the center of Square 3, centered at 217.7 north and 173.8 east. The form of an almost circular patch of

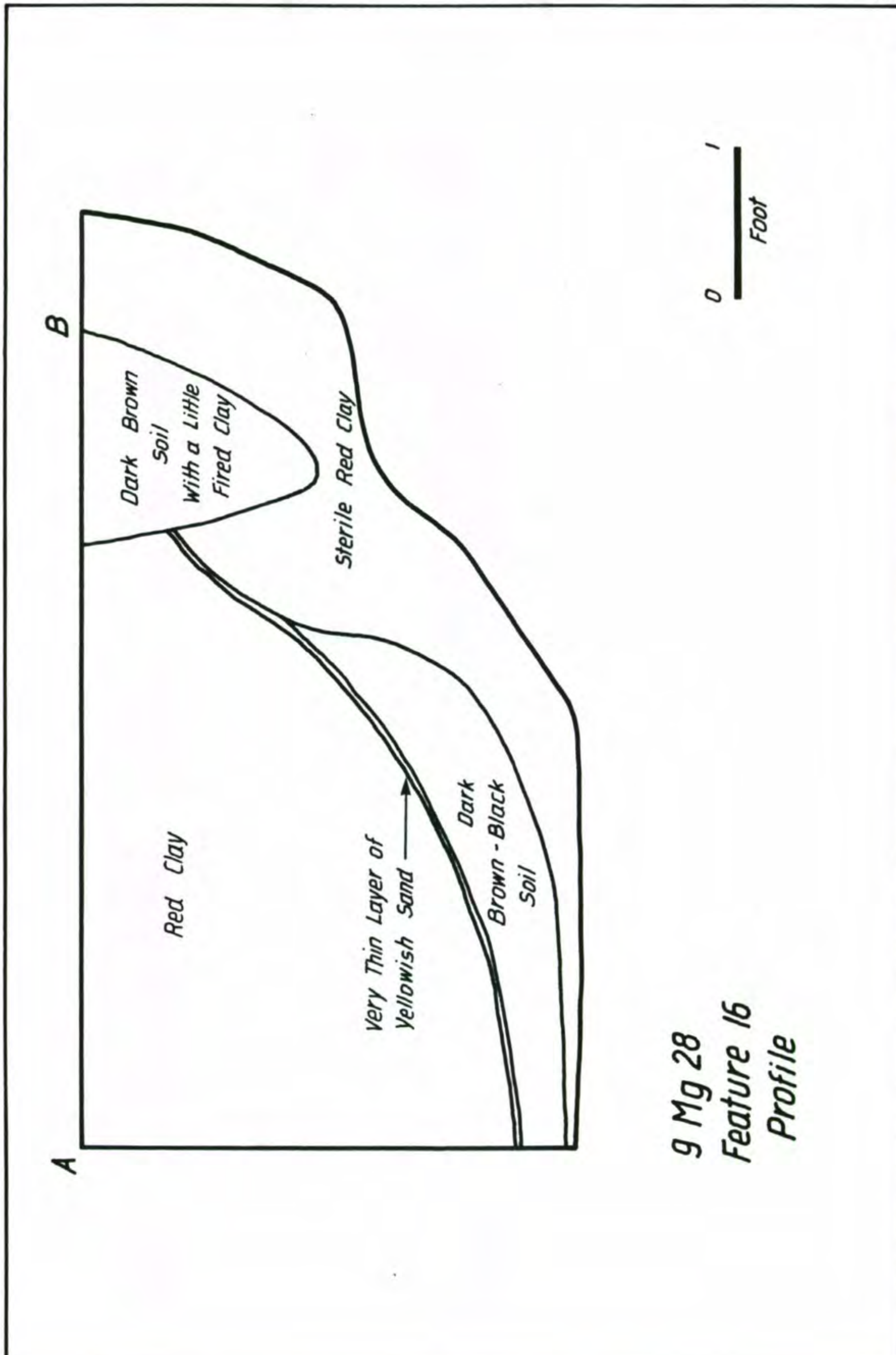

A
B
Dark Brown
Soil
With a Little
Fired Clay
Sterile Red Clay
Red Clay
Very Thin Layer of
Yellowish Sand
Dark
Brown - Black
Soil
0
1
Foot
9 Mg 28
Feature 16
Profile

Figure 19

bright red clay with a large (4 feet by 2 feet) deposit of fired clay chunks in its northern portion (Figure 20). The overall east-west diameter of the feature was slightly larger at 9.0 feet than the north-south dimension of 7.6 feet. No observable brown humus ring surrounded the feature and no artifacts were present on its surface. Although the feature was not excavated the center of the feature was auger tested. The bottom of the feature appeared to be 2.5 feet deep and a distinct black layer was noted at the bottom. Samples taken from the large pile of fired clay showed impressions of small tree sections.

Feature 18

This small circular feature was found in the south central part of Square 2 (Figure 20). The exact location is 206.9 north, 119.9 east. The diameter was 3.6 feet and the maximum depth after excavation was .9 feet. The fill consisted of a mixed, indistinct mass of grey ash and charcoal with occasional inclusions of fired red clay pieces. Some evidence of stratigraphy is apparent but layers do not seem to go over the entire diameter and much mixing is present. The feature was excavated by alternate quadrants in the usual manner and much of the fill was window screened. The broken fragments of a small portion of one ceramic vessel was found under all the ashy fill at the bottom of the pit. Additionally, one light colored chert flake was recovered. Some 90 animal bone fragments were also recovered. The size of all these was quite small. The pit shape, as revealed after excavation, was one of vertical sides and a slightly irregular flat bottom.

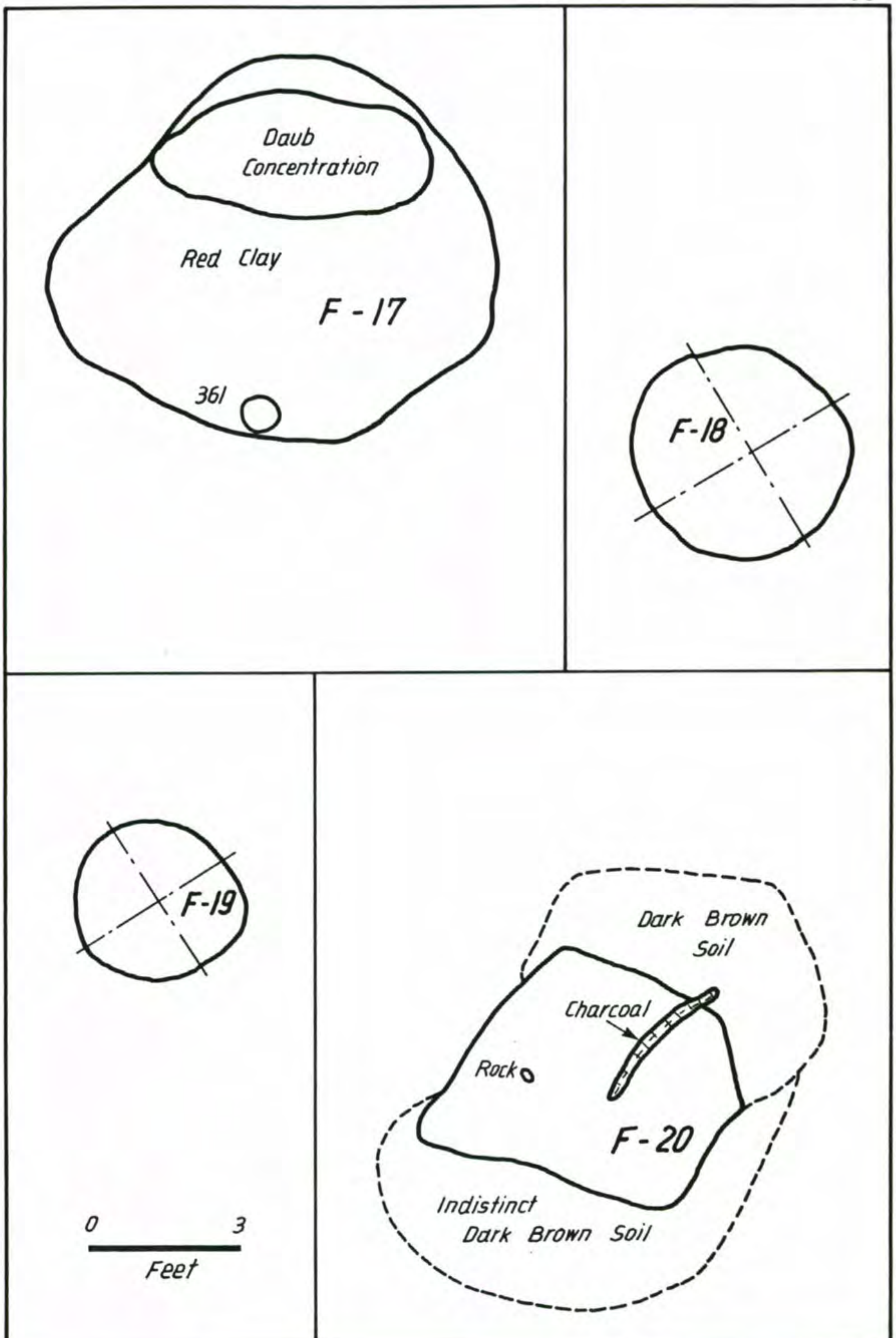

Daub
Concentration
Red Clay
F - 17
361
F-18
F-19
0
3
Feet
Dark Brown
Soil
Charcoal
Rock
F - 20
Indistinct
Dark Brown Soil

Figure 20

Feature 19

Located 7 feet northeast of Feature 18, Feature 19 was quite similar in form to the former (Figure 20). The exact location in Square 2 is at 211.3 north and 125.6 east. The depth after excavation of this 2.9 foot diameter circular pit was .8 feet. Excavated in the quadrant method, this feature had straight walls and a flat bottom. No evidence of stratigraphy was present in this ash filled pit. Some small scattered fragments of fired red clay were included in the grey ashy fill, mostly near the top, along with some charcoal. A total of 99 animal bone fragments were found in the feature. Additionally one yellow chert and two quartz flakes were noted. The most obvious artifact included in the feature were the crushed remains of a large portion of a single plain pottery vessel. This was lying flat on the bottom of the feature, under the ash and mostly in its southeastern part.

Feature 20

Feature 20 was located in the southeast corner of Square 2. The exact location was at 208.3 north, 138.6 east. The form was of a center area of bright red clay bordered on the northeast and southwest edges by broad areas of dark humus (Figure 20). The humus on the southern side was less distinct than that on the north. One streak of charcoal, perhaps a log fragment, was on the north side lying toward the middle of the feature. The maximum northeast-southwest dimension of the feature was 10.0 feet and the perpendicular width was 6.7 feet. No artifacts were located on the top of this feature and it was not excavated.

Feature 21

Just north of Feature 20 was Feature 21. It was identified as an oval patch of bright red clay with dark humus bordering the northern and southern portions of the red clay (Figure 21). One post mold intruded on to the southern edge. The maximum diameters were 10.7 and 10.5 for the north-south and east-west dimensions respectively. The depth of the feature is unknown as it was not excavated. No artifacts were noted on its surface.

Feature 22

Located in the west center portion of Square 2, this feature had a bright red clay center, in this case in an elongated east-west shape with an indistinct dark humus surrounding the western portion of the red clay (Figure 21). A moderate size pile of fired clay fragments with bits of charcoal included lay on the red clay at the tip of the feature. The center of the feature was at 222.5 north and 126.5 east. The maximum length of the feature was 17.5 feet in the east-west direction and the minimum was 9.1 feet north-south. The feature was not excavated and no artifacts were recovered.

Feature 23

This feature was on the boundary of Squares 1 and 2 near their northern edge. It was centered at 245.6 north and 101.7 east. The major portion of the feature consists of a circular area of bright red clay 7.0 feet in diameter (Figure 22). The edges of this bright red area faded to sterile red clay past this point. In the center of the red area a small (1.5 feet by 1.0 foot) area of charcoal, ash, and fired clay fragments was noted. A few sherds were noted in the top of this

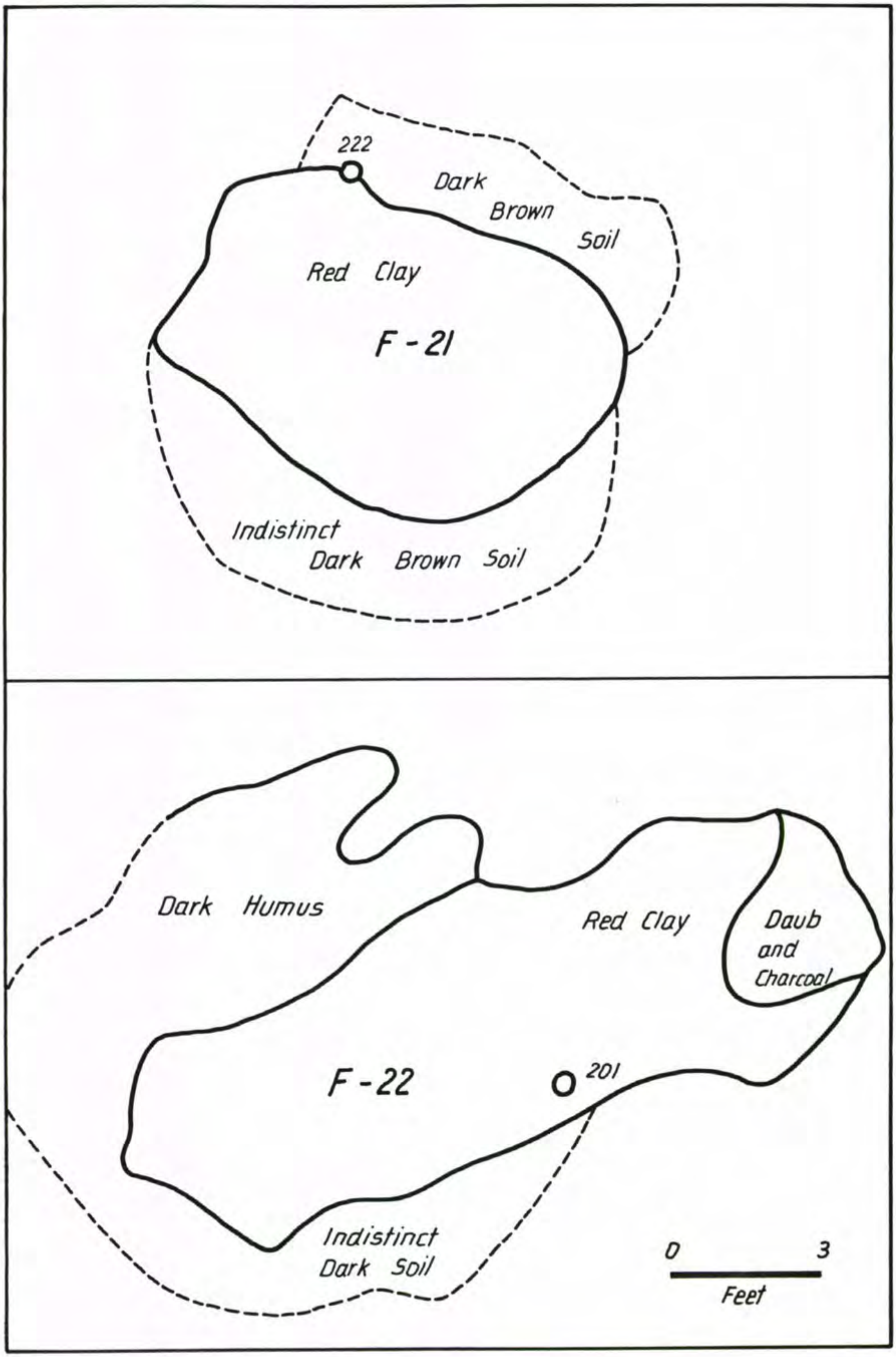

222
Dark Brown Soil
Red Clay
F - 21
Indistinct Dark Brown Soil
Dark Humus
Red Clay
Daub and Charcoal
F - 22
201
Indistinct Dark Soil
0
3
Feet

Figure 21

debris. The only excavation for this feature consisted of the hand excavation of this center portion of the feature. The fill of this pit consisted of grey ash with abundant charcoal and some small fired red clay pieces. Additionally, eleven potsherds, all apparently belonging to the Bell Phase occupation were located. The total depth of this ashy fill was 1.9 feet. This central feature did not appear to be a post mold, but this is not certain. A small area of charcoal was noted in the red clay just east of the center "hole" and some additional fired clay was present on its northern edge.

Feature 24

This feature was located in the north central portion of Square one centered at 244 north and 71.5 east. The form is of an irregularly shaped area of bright red clay with a patch of brown humus on the eastern edge (Figure 22). The maximum length north to south was 7.5 feet while the width was 4.6 feet. One post mold intruded the feature on its western edge. No artifacts were visible on its surface and it was neither excavated nor auger tested.

Feature 25

Located in the south central portion of Square 1, this feature was not completely exposed. Only about 3/4 of this square had been stripped by the heavy machinery. The center of the feature was located at 216.5 north and 70.5 east. The form was that of a bright red clay area with no apparent surrounding dark humus (Figure 22). The east-west diameter of this almost circular feature was 5.9 feet. It was not excavated nor tested and no artifacts were on its surface. The characteristics of the

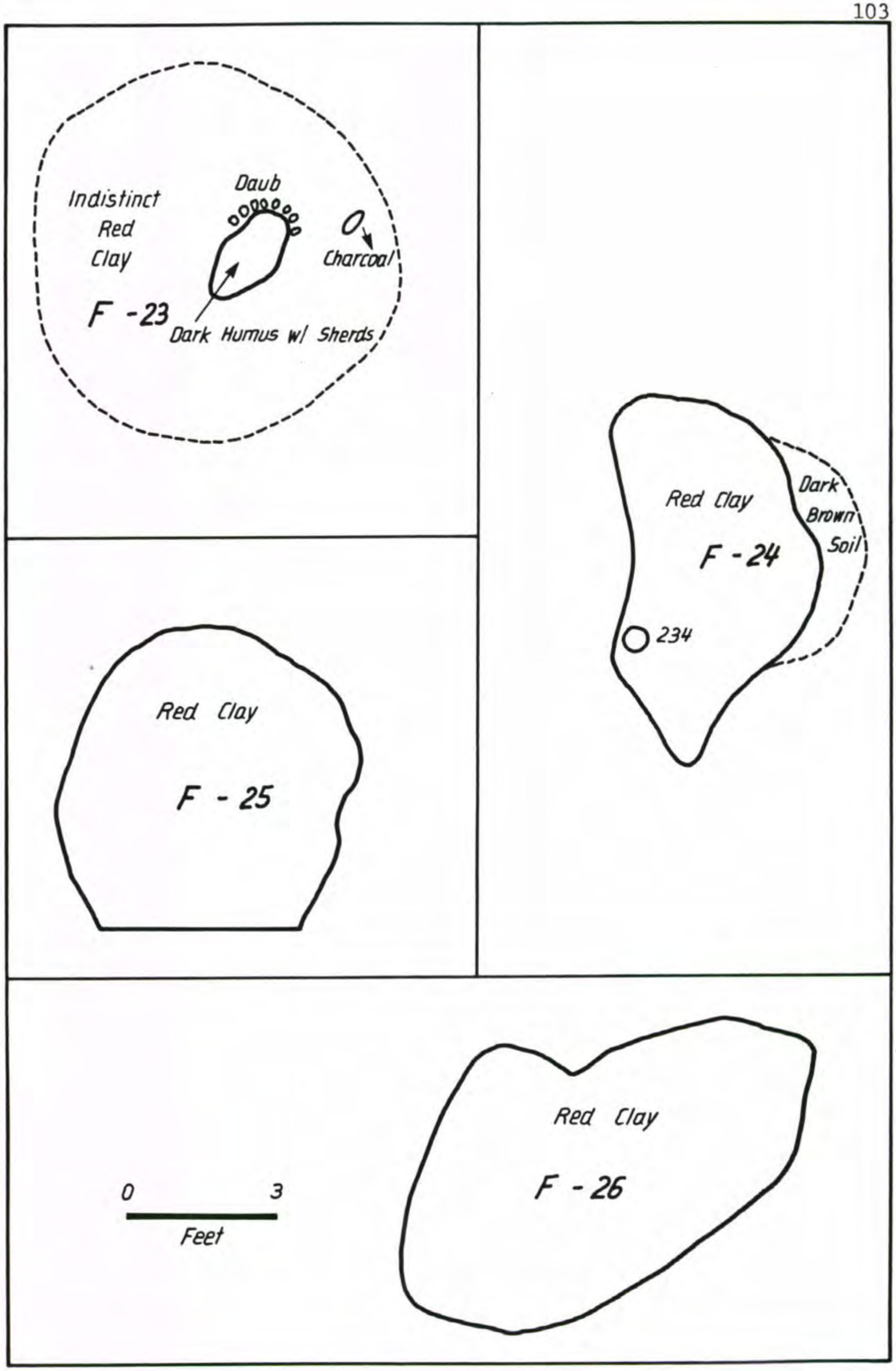

Indistinct
Red
Clay
Daub
Charcoal
F - 23
Dark Humus w/ Sherds
Red Clay
F - 24
Dark
Brown
Soil
234
Red Clay
F - 25
Red Clay
F - 26
0
3
Feet

Figure 22

bright red clay made it probable that this is a feature similar to the many other red clay features previously described.

Feature 26

Feature 26 was found in the northwest corner of Square 1 with its center at 239.5 north and 52.0 east. The western edge actually goes outside the mapping unit but was included anyway. The form is of an elongated area of bright red clay (Figure 22). Its maximum length, in a grid northeast-southwest direction was 9.5 feet while the perpendicular dimension was 4.5 feet. No area of dark soil was noted. Again, there were no exposed artifacts and the feature was unexcavated.

Feature 27

This feature was located in the northeast portion of Square 1 just southwest of Feature 23. It was formed by a large irregular patch of bright red clay with a small area of dark brown humus bordering its northern edge (Figure 23). The center of the feature was at 235.0 north and 89.0 east. The maximum north-south diameter was 11.2 feet while the east-west width was 8.3 feet. No excavations were performed on Feature 27.

Feature 28

Located in Square 3 at 217.5 north and 161.5 east this feature was just west of Feature 17. Its form was of a large oval area of bright red clay with a moderate sized area of brown humus bordering most of the eastern edge (Figure 23). There was also a small area of fired clay fragments and charcoal pieces in the east center part of the red clay. The north-south diameter of the feature was 11.6 feet while the east-

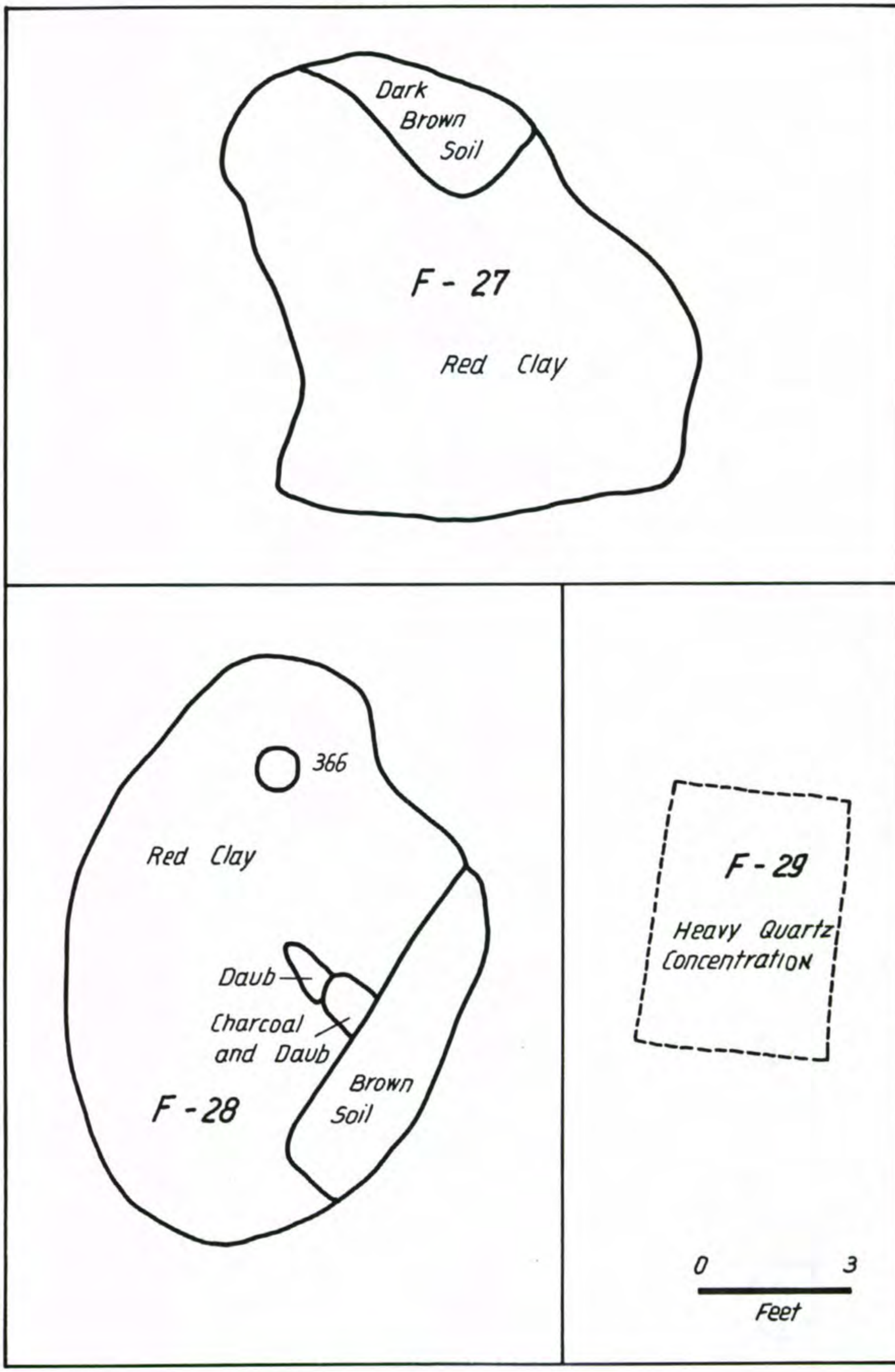

Dark
Brown
Soil
F - 27
Red Clay
366
Red Clay
Daub
Charcoal
and Daub
Brown
Soil
F - 28
F - 29
Heavy Quartz
Concentration
0
3
Feet

Figure 23

west dimension was 8.2 feet. One post mold was intrusive on the northern edge of the red clay. No artifacts were noted and no excavations were made on this feature.

Feature 29

This is not a feature in the usual sense of the word. Rather, it was a small area (about 5 by 4 feet) which produced a large number of quartz flakes and a couple of Early Archaic stone tools (an Edgefield scraper and a Dalton point) (Figure 23). The items were all recovered at the very top of the sterile red clay soil as a result of the shovel scraping and mapping operation in the square. No visible disturbances were noted. Apparently the area was a small Early Archaic hunting camp or chipping station. No further information on this very early component at the site was found elsewhere on the site. The center of Feature 29 was at 243.5 north and 170.5 east.

Feature 30

Feature 30 was on the boundary of Squares 4 and 5 centered at 250 north and 220 east. It consisted of an elongated oval with the long axis in the grid northwest-southeast direction (almost true north and south) (Figure 24). The maximum length was 12.5 feet while the width was 7.4 feet. The major portion of the surface exposure was of a bright red clay. A moderately large area of dark brown humus bordered the eastern edge of the feature. One post mold was intrusive on the northern edge. No artifacts were noted and it was not excavated.

Feature 31

This feature was located in the west central portion of Square 5 with its center at 276.5 north and 245.5 east. The form was of a slightly elongated circle, the fill of which was a dark brown mottled humus (Figure 24). The north-south diameter was 4.0 feet and the east-west was 3.2 feet. Excavation revealed this as Burial 2. The burial was of an adult of indeterminate sex in a flexed position lying on the right side (Figure 25). Preservation was poor and only a few femur and skull fragments were actually present. The head was to the grid north direction while the face was thus to the grid west direction. The length of the burial was 2.4 feet and the width was 1.3 feet. The depth of the burial pit was 1.1 feet. The walls were vertical and the bottom was flat. No artifacts were found as associations with the burial or in the fill above it.

Seven intact teeth were recovered from the face area. Four of these were premolars and three were molars. The premolars all had their crowns worn down to what would have been about the gum line. Two of the molars were 1st molars and had cavities on the sides. The crowns were still present, however. The third molar (an M3) was worn a moderate amount and had one small occlusal cavity. This meager evidence points to an age of 40+ for this individual.

The feature was intrusive into the western edge of Feature 32. Portions of the fill over the burial were waterscreened but nothing was found.

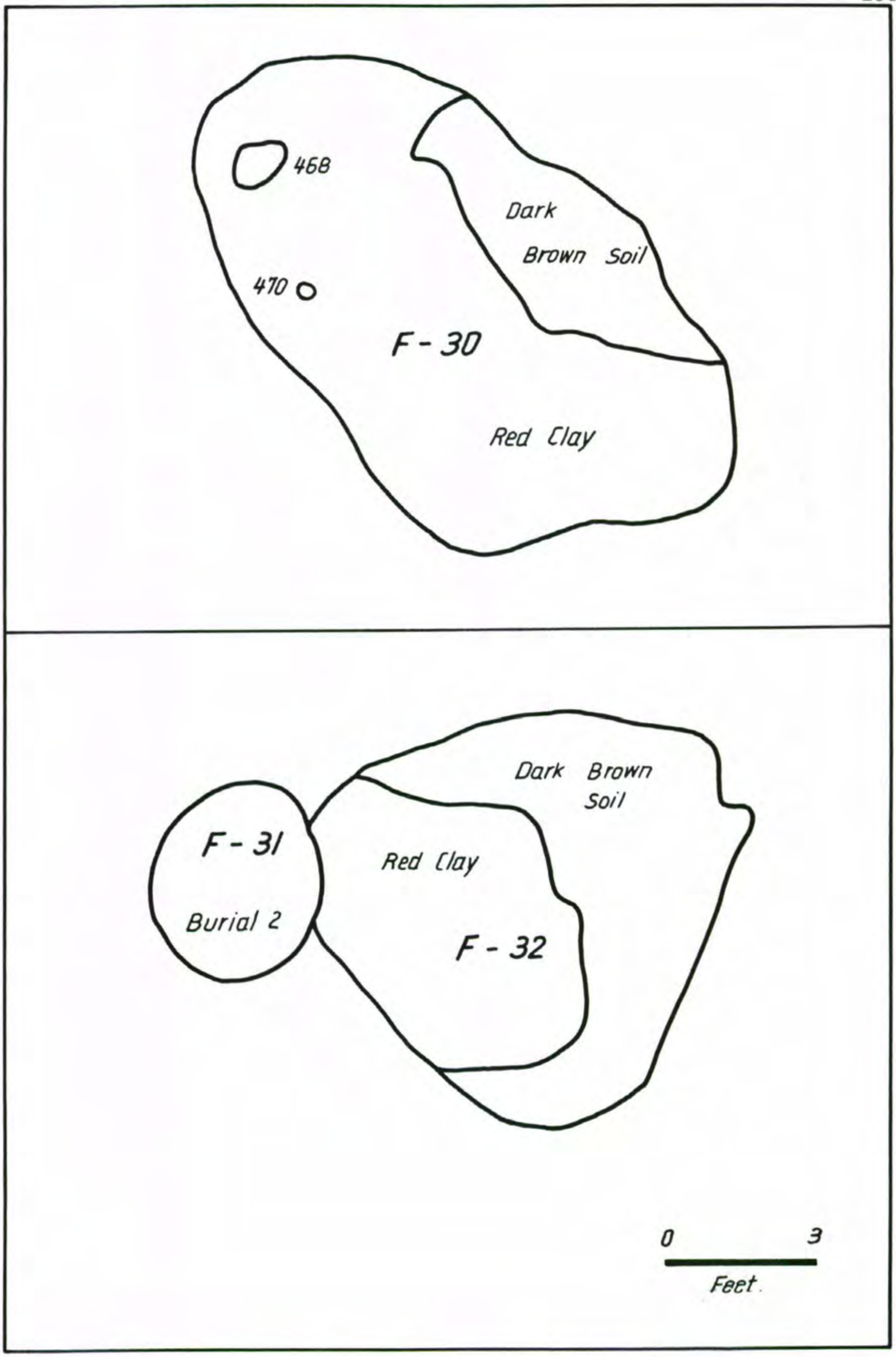

468
470
Dark
Brown Soil
F - 30
Red Clay
Dark Brown
Soil
F - 31
Burial 2
Red Clay
F - 32
0
3
Feet.

Figure 24

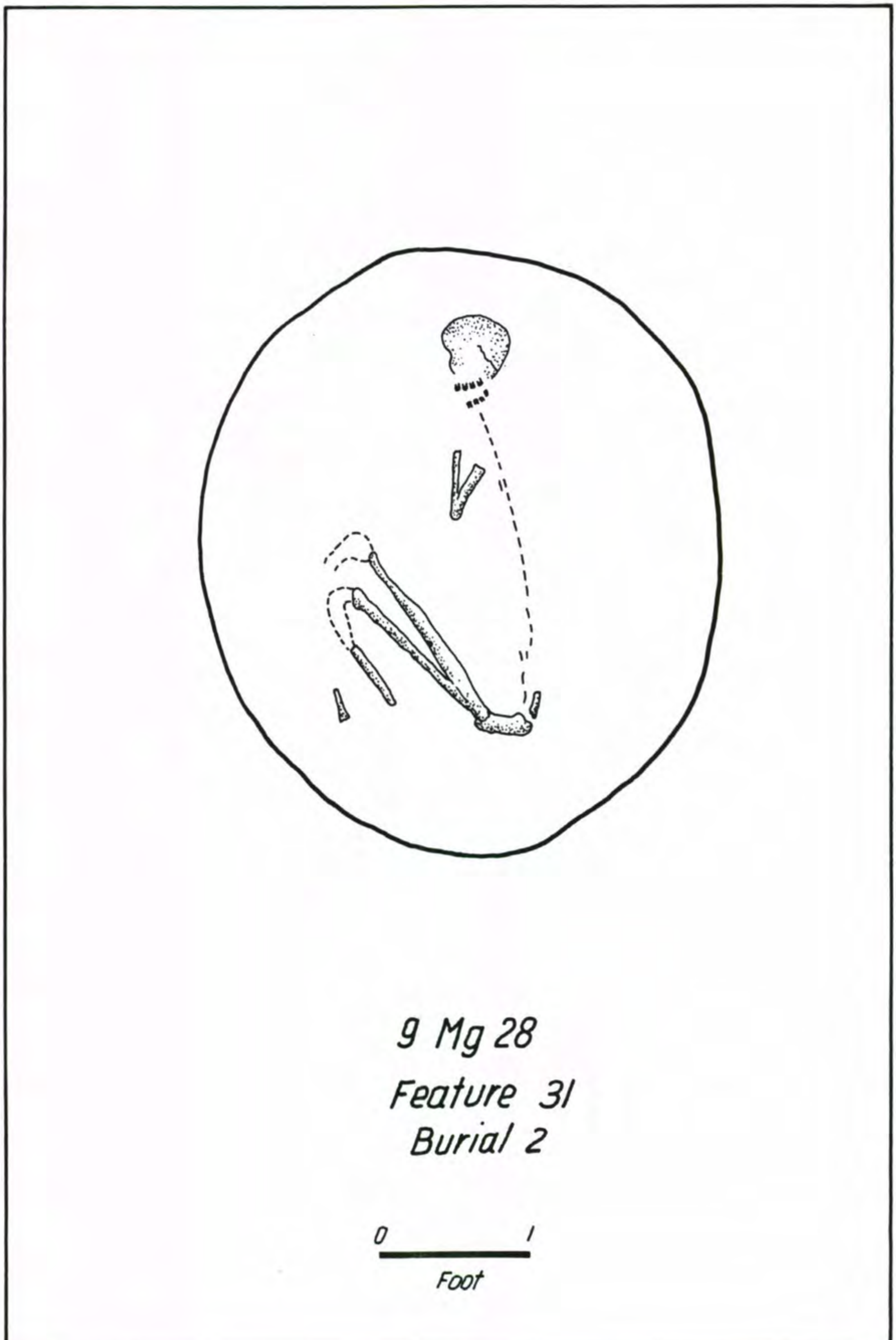



Figure 25

Feature 32

This feature was just east of and intruded by Feature 31. This feature consisted of moderate size area of bright red clay with a large area of brown humus bordering the north, east, and south (Figure 24). The center of the feature, which is between Squares 5 and 12 was 276.5 north and 251.0 east. The maximum north-south diameter of the feature was 8.6 feet and the width at right angles to the above was 8.4 feet. Feature 32 was not excavated and no artifacts were noted on its surface.

Feature 33

Located near the center of Square 5, Feature 33 consisted of an oval area of bright red clay almost completely surrounded by a band of dark brown humus (Figure 26). The humus was widest on the eastern edge of the red clay. The feature was centered at 282.0 north and 229.0 east. The maximum north-south length was 9.0 feet and the width of the feature was 7.2 feet. No excavations were undertaken and no artifacts were recovered.

Feature 34

This feature was located 6 feet to the grid northwest of Feature 31. The exact location in Square 5 was 281.0 north and 237.3 east. The form of the feature was that of a small slightly elongated circular feature with a dark mottled humus (Figure 26). The maximum length was 3.1 feet east-west and 2.55 feet north-south. After excavation this feature proved to be that of a human burial. The total depth of this burial pit (Burial 3) was 2.3 feet. The form was with vertical walls and a flat bottom.

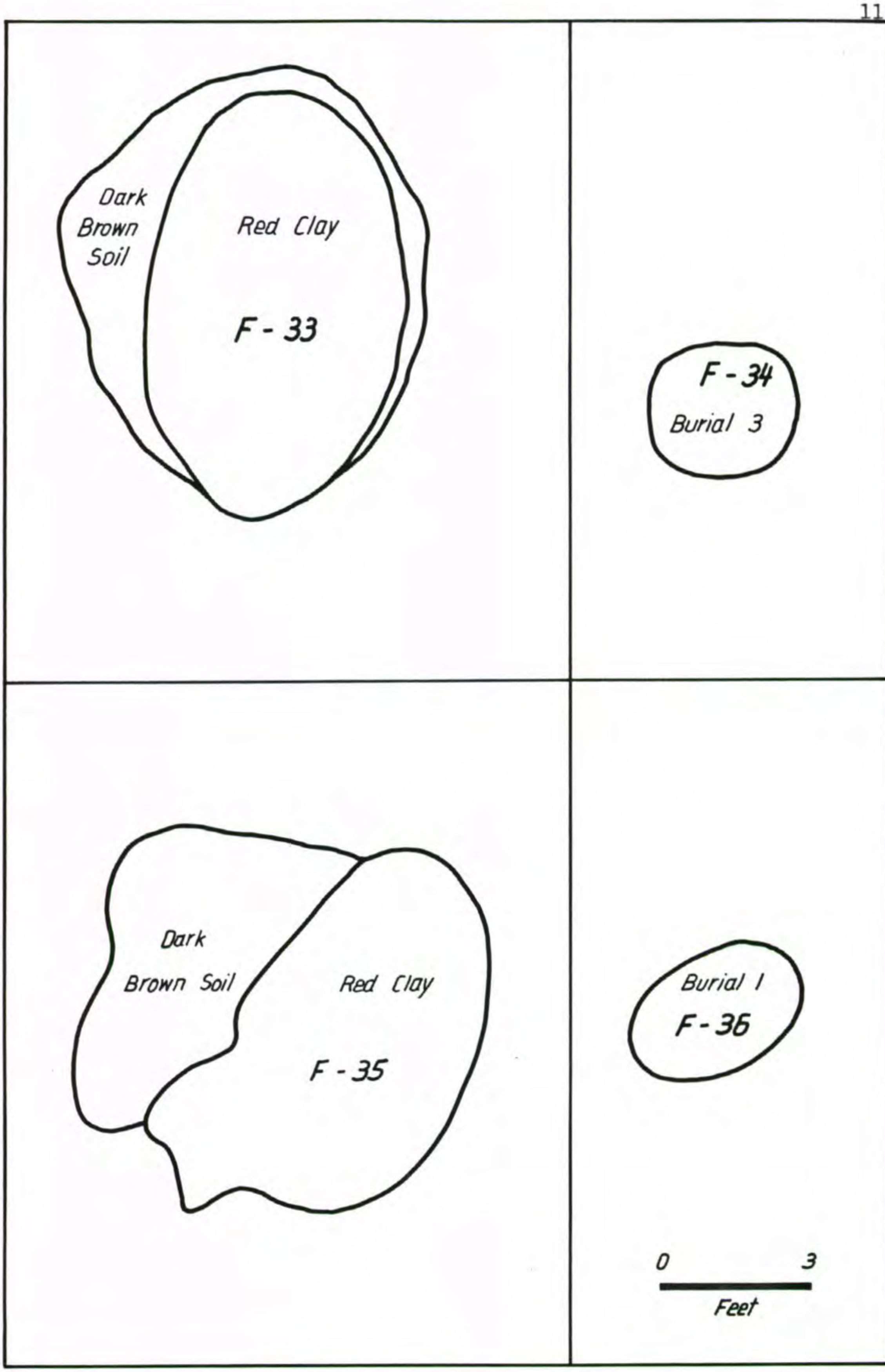

Dark
Brown
Soil
Red Clay
F - 33
F - 34
Burial 3
Dark
Brown Soil
Red Clay
F - 35
Burial 1
F - 36
0
3
Feet

Figure 26

This burial was flexed and lying on its right side (Figure 27). The head was to the east side of the pit and the face was to the north. The overall length of the burial was 2.4 feet and the width was .8 feet. Preservation was very poor. The only bones retaining any form were the leg bones and even they would crumble on touch. The skull and pelvis were just stains in the sterile red clay on the floor of the pit. The sex of the individual was therefore indeterminate. The size of the bones indicated an adult. A total of 22 teeth (plus a few fragments) were found in the mouth area; the mandible and maxilla were completely deteriorated. Only the enamel caps were left of these teeth, the roots having rotted away. All four canines and all eight premolars were present as well as one lower lateral incisor, two upper lateral incisors, one upper central incisor, one 3rd molar, and five other molars (either M1 or M2-the lack of roots makes separation difficult). There were cavities on one of the pre-molars and the third molar (a small occulusal one). The tips of the canines, incisors, and some of the pre-molars were quite worn. The molars, except for one probable M1 were not badly worn. There was considerable calculus build up around the base of two of the molars. The wear evidence indicates an age estimate of about 25-30 years.

One incised rim sherd, a few quartz flakes, and a few pebbles were found in the fill over the burial. Two European made glass beads were found in the neck area of the burial. Whether these were part of burial offerings or merely an item of clothing is uncertain. The latter seems quite possible, however. The beads were of a spherical shape, 5 mm in diameter and of a dark blue-green color. Marvin Smith (Personal Communication) dates these beads as anywhere from 1560 to 1800 and adds that

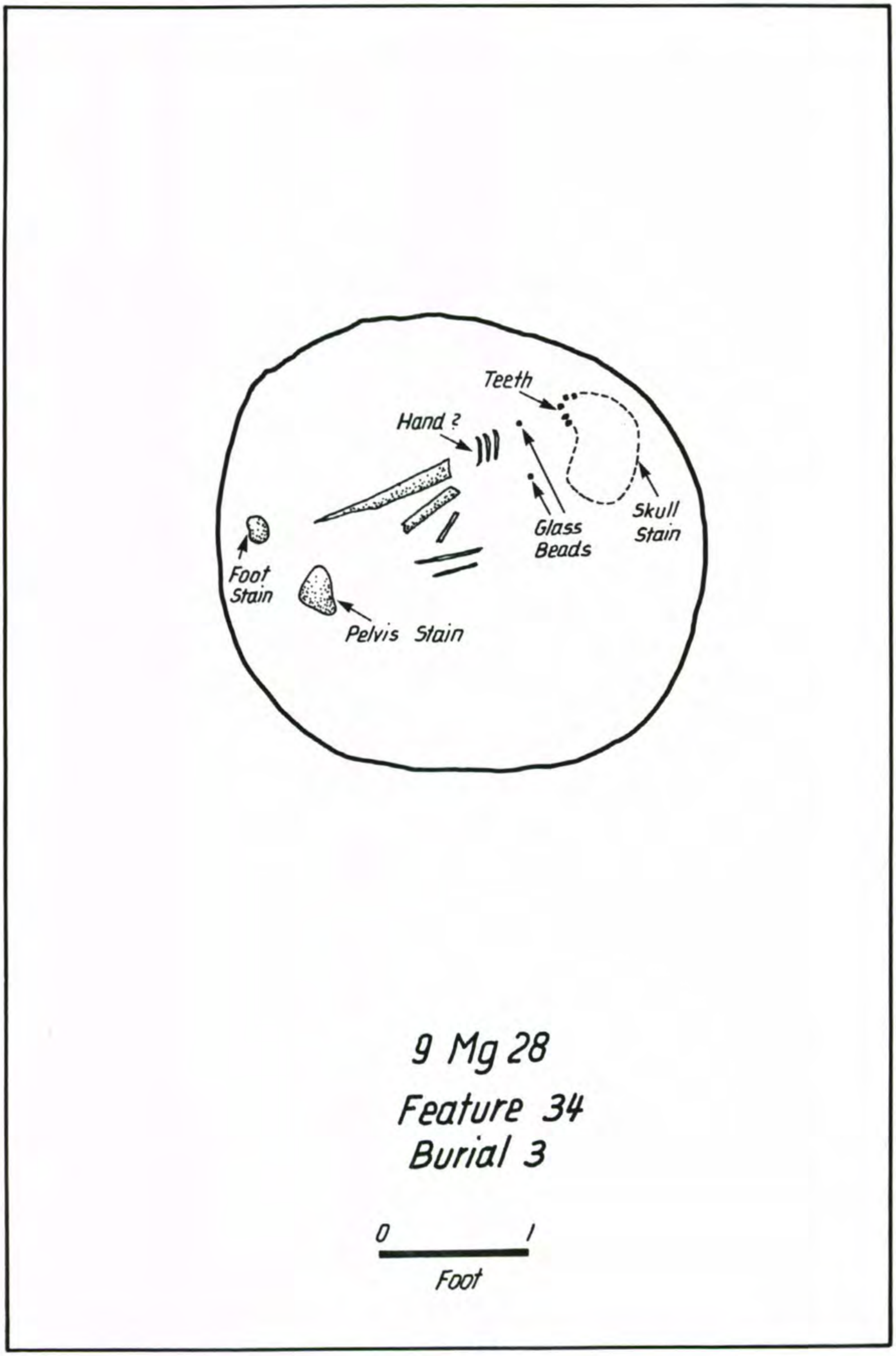

Teeth
Hand ?
Glass Beads
Skull Stain
Foot Stain
Pelvis Stain
9 Mg 28
Feature 34
Burial 3
0
1
Foot

Figure 27

they are quite common throughout the Southeast. Further discussion of these beads will be presented in the next chapter.

## Feature 35

Feature 35 was found in the northeast corner of Square 5 with the center located at 295.5 north and 244.0 east. The feature consisted of a moderately large patch of bright red clay with an area of dark brown humus of equal size on its northwest edge (Figure 26). The overall east-west length was 8.2 feet and the north-south diameter was 7.8 feet. Feature 35 was not excavated and no artifacts were recovered.

## Feature 36

This feature was found directly between Features 16 and 30 on the border of Squares 4 and 5. The center was located at 249.9 north and 206.0 east. The form of the feature was an oval pit with the long axis in an east-west direction (Figure 26). The maximum length was 3.7 feet and the width was 2.6 feet. The fill was of a mottled dark humus with flecks of charcoal and sandy red clay bits. Excavation revealed the presence of a human burial (Burial 1). The pit was quite shallow, the depth after removal of the burial being .5 feet. The only items found in the fill with the burial were one small plain potsherd, one small lump of fired clay, and one small (1" square) fragment of clam shell. It is doubtful that these are other than accidental inclusionswith the burial. Of the three burials found at 9Mg28 this was the best preserved. It still, however, was only in fair to poor condition.

The burial was in a tightly flexed position lying on its right side (Figure 28). The left arm was over and around the flexed legs. The head was to the west end of the pit and thus the face was to the south.

The skull was up against the side of the pit so that the body did not occupy the entire burial pit. The length of the burial was 2.6 feet and the width was 1.5 feet. The hands were missing and most of the skull had been plowed away as it had been slightly higher than the other bones in the shallow pit.

The better preservation allowed this burial to be more accurately aged and sexed. The sex of the individual was probably male. Although the innominate bones could not be removed intact, field inspection of the greater sciatic notch revealed a quite narrow angle consistent with a male denomination. Later inspection of the pelvis fragments revealed no evidence of a pre-auricular sulcus on the better preserved left innominate and the mastoid processes at the base of the skull were quite well developed. Both of these traits are masculine tendencies. The sexual identity is not completely certain, however, as the long bones were generally not robust. In particular, the linea aspera on the femora were quite smooth. These are female tendencies. The weight of the evidence is for a male identification, however.

The evidence for the age of the burial comes from the teeth, tibias, and ilia. Although the ends of most of the long bones were heavily damaged by decay, the proximal ends of the tibias clearly showed a lack of epiphyseal closure. The typical "billowed" surface appearance was clear. Bass (1971:188) says that these epiphyses begin closure at age 16-17 in males and is completed by age 23. The illiac crests were also unfused-this doesn't occur much before age 23, however (Bass 1971:190).

All but one of the 32 teeth (lower right 2nd molar) were recovered from the skeleton. The 3rd molars ("wisdom" teeth) were apparently erupted, although none had any wear evident. The tops were worn off of

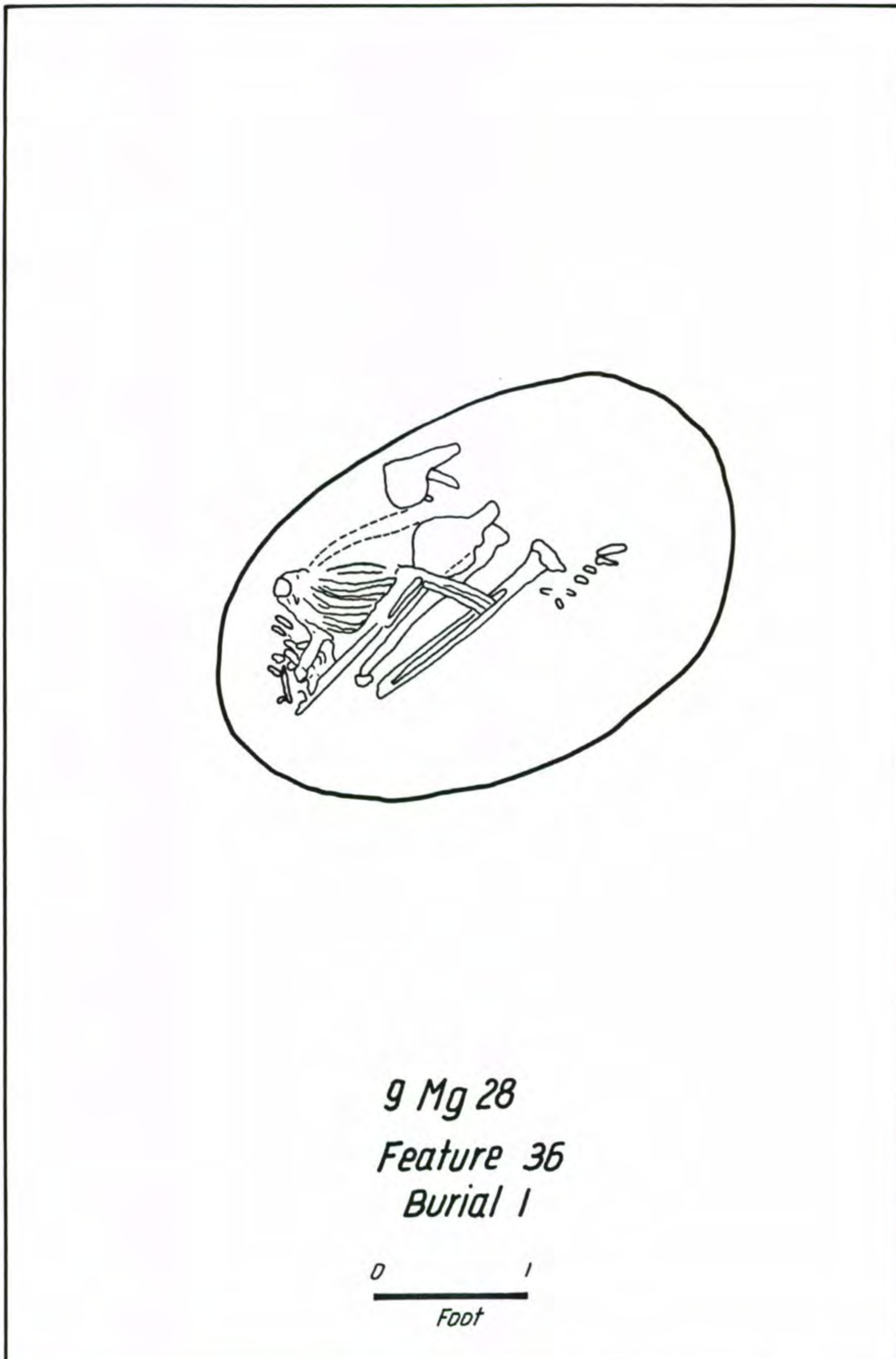



Figure 28

the lower incisors, but the rest of the teeth had only slight wear. As the age of eruption of the 3rd molars is about 18, and, in consideration of the evidence of the tibias, the age of this individual at death was probably 18 or 19.

A number of other non-metric observations were made on the teeth. Caries were present on three different molar teeth. A moderately large one was on the lower left M2, while small ones were present on the lower left M1 and the upper left M2. All caries were on the occlusal surfaces. The upper central incisors were strongly shovel-shaped and the upper lateral incisors were barrel shaped, a trait not known to the author to have been previously reported from Indian skeletal material from Georgia. The teeth were quite crowded and crooked in this individual. The lower left 3rd molar was rotated a full $90^{\circ}$ from normal position. There were enamel extensions onto the root surface on four molars (generally on the buccal side of the tooth). These were the left upper and lower 2nd molars, and left lower 3rd molar, and the right lower 1st molar. Protostylids were present on both 1st molars (lower of course), although no Carabelli's cusps were present on the upper molars. Finally, the roots on both upper 2nd molars were fused into just one root each.

The height of the person is estimated at 5'8" based upon an estimated left femur length of 470MM and using the formula for mongoloid populations provided by Bass (1971:175). What appears to be mild osteosclerosis occurs on the anterior surface of both tibias. No other bones appeared to be involved. Both Morse (1969:52) and Brothwell (1965:136) discuss this symptom as indicative of a Treponena infection-either Syphilis or possible Yaws. It is still possible, however, that the changes on the tibias of this skeleton may have resulted from post inhumation modification due to decay.

Feature 37

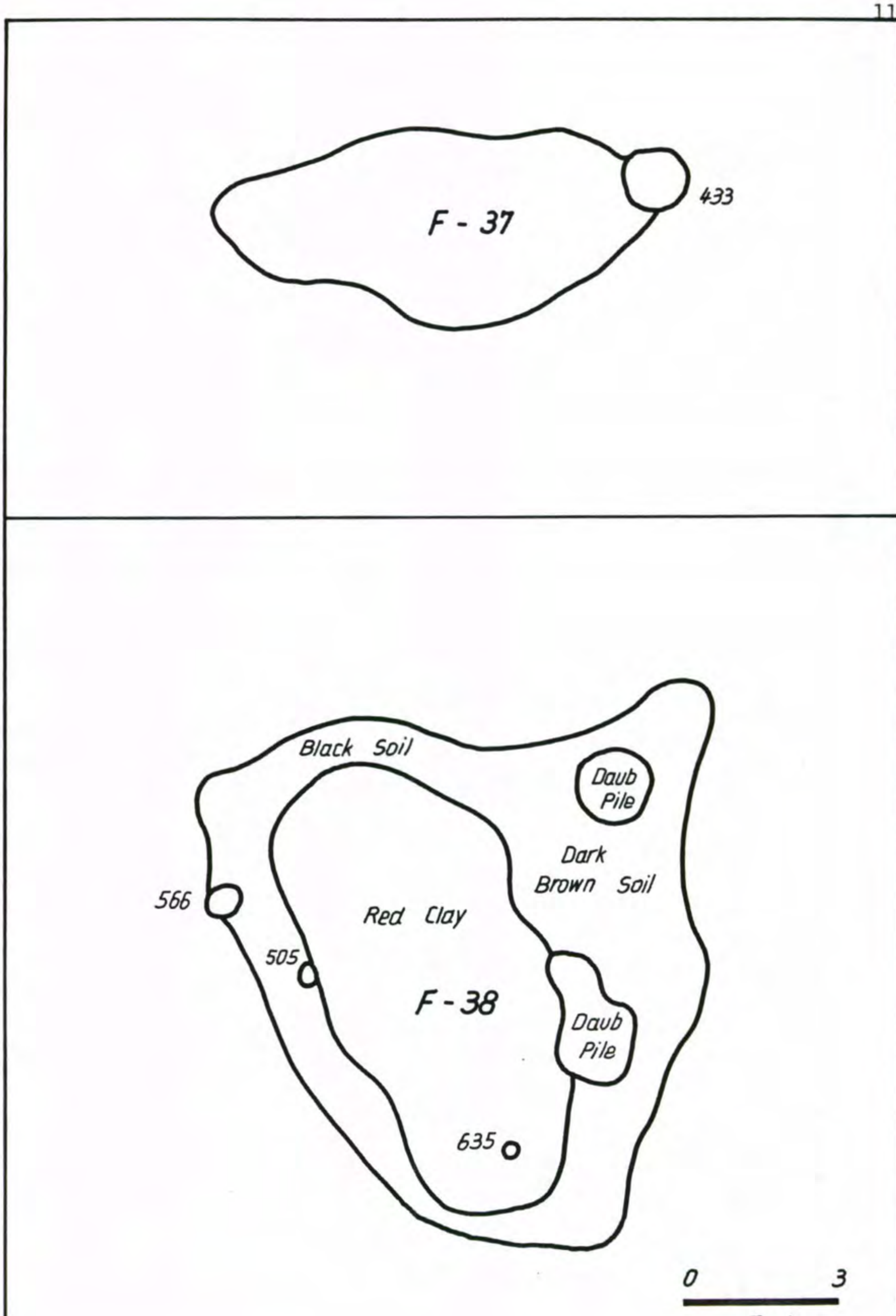
This feature is a long irregular patch of dark brown-black humus which was in the east central portion of Square 5 just south of Burials 2 and 3 (Features 31 and 34) (Figure 29). The center of the feature was at 272.5 north and 237.5 east. The maximum length, in the grid east-west direction, was 9.0 feet while the grid north-south width was 4.0 feet. The feature was in the general line of the wheels of the heavy earth mover that stripped the site and this may have been a spot where the wheels spun. The feature was not excavated, and no artifacts were seen on its surface. The fill was more mottled than that of the three burials just described.

Feature 38

This feature was found in the east central part of Square 6 with its center at 278.0 north and 195.5 east. The form is that of a large area of bright red clay completely surrounded by an even larger area of dark brown humus (Figure 29). Two piles of fired red clay fragments were included, one in the northeast corner in the brown fill, and one in the eastern portion at the junction of the red clay and the brown humus. Three post molds intrude the feature on the western side. The feature was not excavated and no artifacts were recovered.

Feature 39

This feature was found in Square 7 in the north central portion of that square just south of Feature 12. The center was recorded at 286.5



F - 37
433
Black Soil
Daub Pile
Dark Brown Soil
566
Red Clay
505
F - 38
Daub Pile
635
0
3
Feet


Figure 29

north, 125.0 east. The form was that of a long irregular shaped area of dark humus, charcoal, and fired clay fragments (Figure 30). The maximum north-south dimension was 9.2 feet and the width was 3.0 feet although this was somewhat variable. No artifacts were noted and the feature was not excavated. The vicinity of Feature 39 was very difficult to read archaeologically and it is possible that an undetected area of red clay was associated with this feature.

Feature 40

Found in Square 10, between Features 6 and 10, this feature was centered at 317.5 north and 170.5 east. The form of an irregular oval with a maximum length of 5.8 feet in the grid east-west direction and a width of 3.5 feet (Figure 30). The fill was a mottled dark humus. The feature was not excavated and no artifacts were noted on its surface.

Feature 41

This small feature was in the southeast corner of Square 9 in the immediate vicinity of Features 8, 9, and 42. The center was located at 307.5 north and 188.5 east. The form was of a small center area of bright red clay 3 by 3.5 feet surrounded by a broad band of dark humus (Figure 30). The humus was less distinct on the western edge than on the other three sides. The overall size was 6.5 feet long (grid north-south) by 5.0 feet (grid east-west). The feature was not excavated and no artifacts were noted on its surface.

Feature 42

Feature 42 was at the center of Square 10 and was intruded by Feature 1 and its northern edge (Figure 5). Feature 42 was not

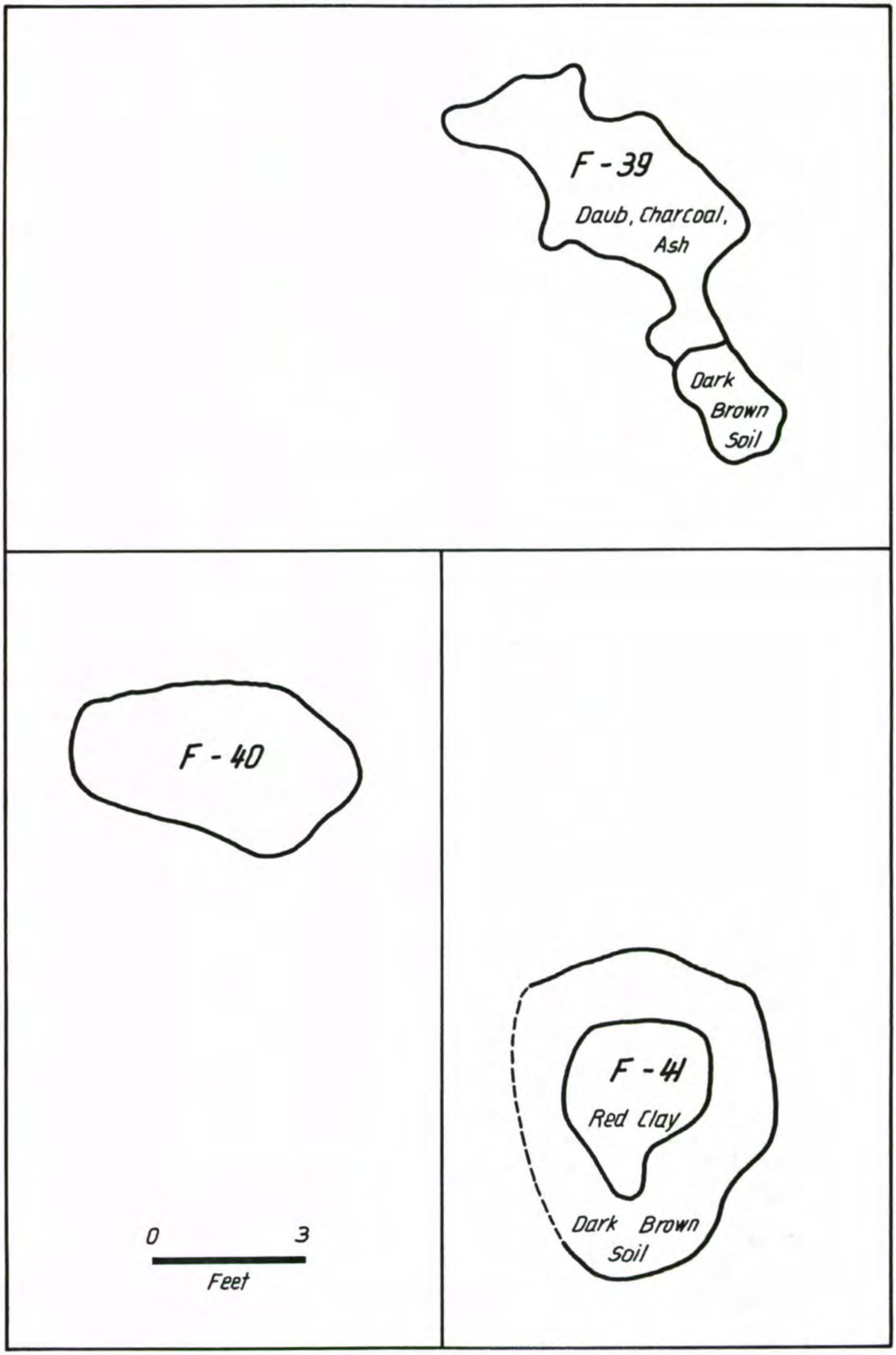

F - 39
Daub, Charcoal, Ash
Dark Brown Soil
F - 40
0
3
Feet
F - 41
Red Clay
Dark Brown Soil

Figure 30

recognized when Feature 1 was discovered in 1969. At that time red clay was taken as sterile soil in all cases and the mass quantity of material found in Feature 1 diverted attention away from its surroundings. Additionally, Feature 1 was excavated with the bird's eye view provided by a road scraper cut.

The center of Feature 42 was at 330.0 north and 223.0 east. Its form was of a large almost square area of bright red clay with a border of dark humus soil on the southern and western edges. The grid north-south dimension was 11.5 feet while the east-west size was 12.0 feet. A total of nine numbered post molds were recorded as intrusive into the feature. Feature 42 had no artifacts exposed and was not excavated.

Feature 43

This was located in the southwest corner of Square 10 (although it laps over into Squares 5, 6, and 9) with its center at 303.0 north and 202.0 east. The form was of a large bright red clay area surrounded by a generally broad area of dark brown-black mottled humus (Figure 31). A large (three feet in diameter) pile of fired clay fragments was located in the northeast portion of the feature at the junction of the center red clay and the dark humus. Four post molds intruded the southern portion of the feature and Feature 8 intruded onto the southwest edge of the feature. The maximum length of the feature is 14.3 feet north to south while the width is 10.7 feet. Feature 43 was not excavated.

Feature 44

This feature was located in the southwest corner of Square 11 with its center at 202.5 north and 258.0 east. This feature was not completely exposed, a small portion of it going into the unstripped southern portion of the site. The exposed width of the feature was 7.2 feet while the north-south dimension, which includes the unexposed portion is at least 6.5 feet long. The major feature consists of a large area of bright red clay with a narrow band of dark humus and ash on the northern edge, and a pile of fired clay fragments and ash on the eastern boundary (Figure 31). The feature was not excavated and no artifacts were recovered.

Feature 45

This small feature was found in the west center portion of Square 11. The exact center was located at 220.0 north and 262.0 east. The form was of a small circular area of bright red clay with a band of dark humus entirely circling the entire red area (Figure 31). The overall diameter was 6.7 feet.

Although no excavations were performed on this feature during the summer of 1977, a small trench was placed in it in the late fall of 1978 with volunteer help. The trench was 1.2 feet wide and placed on the west center portion of the feature in a north-south direction. Both profiles were recorded from the trench (Figure 32). The maximum depth noted on the profile toward the center of the feature was 2.9 feet. The form was clearly one of a bowl of the dark humus with the bright red clay filling the center depression and overlying the dark humus. One quartz flake was found in the bottom in the brown humus. The bottom was somewhat irregular, but no root or post mold impressions were found on the floor area of the feature.

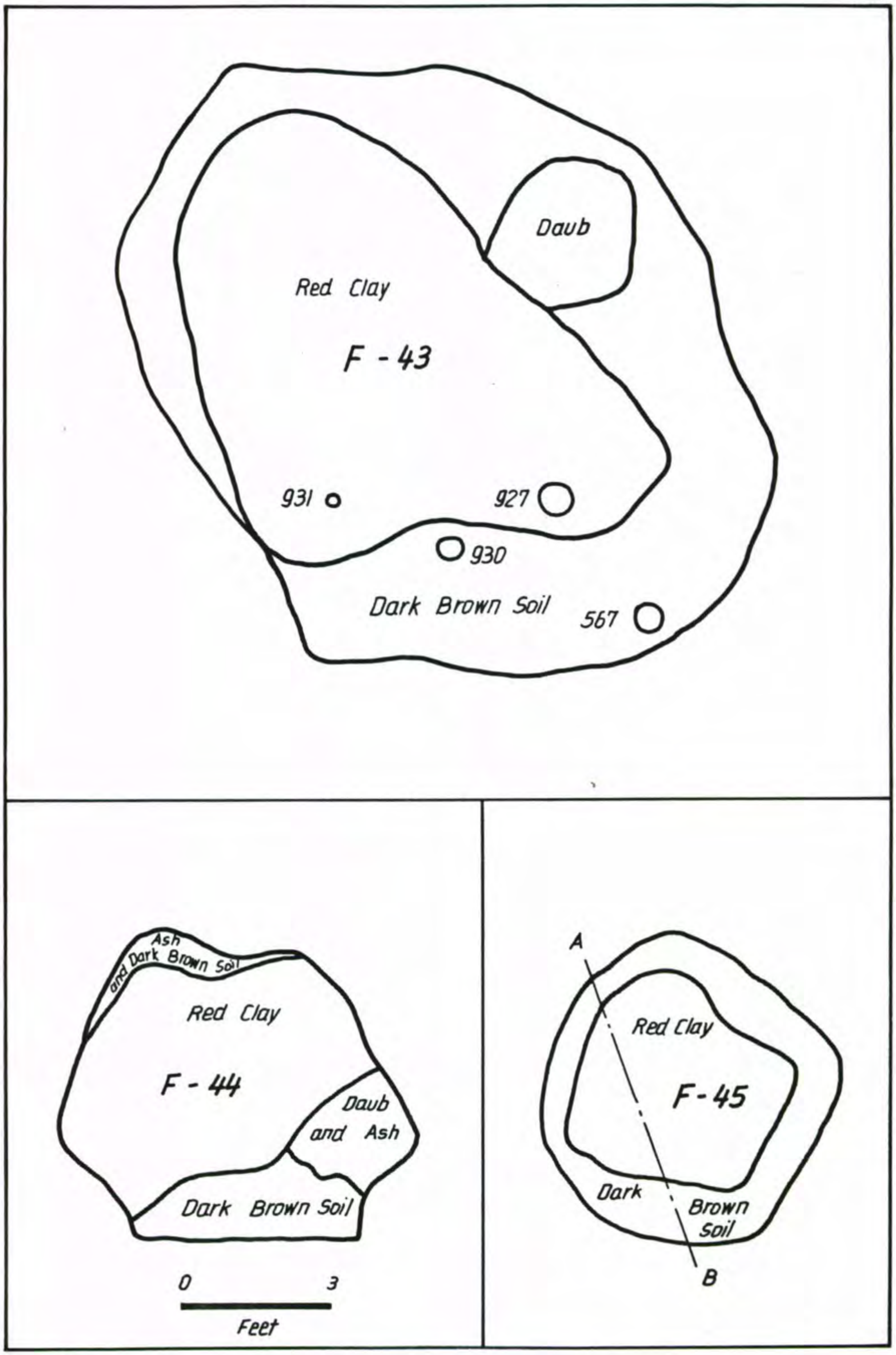

Daub
Red Clay
F - 43
931
927
930
Dark Brown Soil
567
Ash
and Dark Brown Soil
Red Clay
F - 44
Daub
and Ash
Dark Brown Soil
0
3
Feet
A
Red Clay
F-45
Dark
Brown
Soil
B

Figure 31

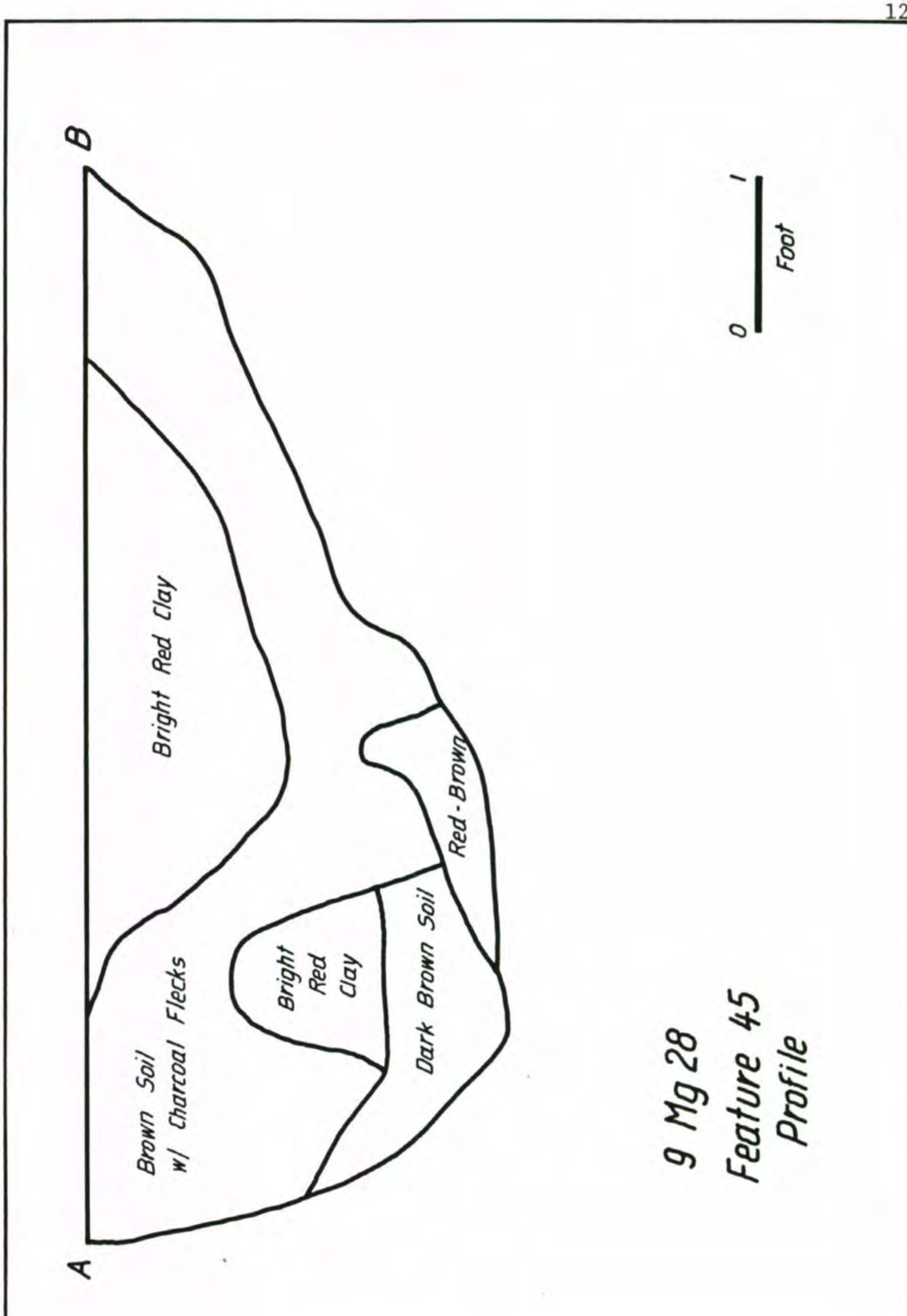

A
B
Bright Red Clay
Red-Brown
Bright
Red
Clay
Dark Brown Soil
Brown Soil
w/ Charcoal Flecks
0
1
Foot
9 Mg 28
Feature 45
Profile

Figure 32

Feature 46

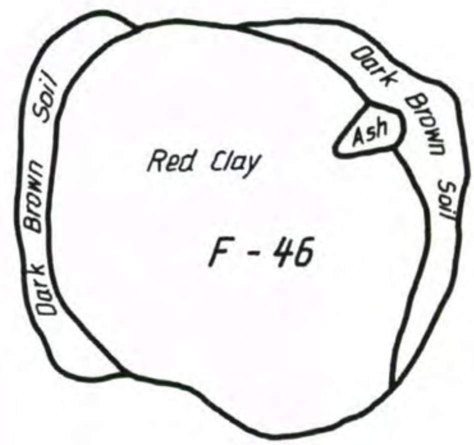
This was the third of four features found in Square 11. Located in the north center part of the square, its center was at 242.5 north and 272.0 east. The by now familiar form was of a medium sized area of bright red clay with a ring of dark humus on the east and west sides of the feature (Figure 33). A small area of ash was located in the northeast part of the feature. The diameter of this nearly circular feature was 6.8 feet. It was not excavated and no artifacts were found on the troweled surface.

Feature 47

Again located in Square 11, this feature, like Feature 44, was not completely exposed on its southern edge. The center of the feature as measured was at 205.0 north and 273.0 east. The uncovered width was 10.0 feet, but may have been as much as 13 feet total. The major portion of the feature was a large area of bright red clay (Figure 33). Dark humus bordered the eastern and western edges of the feature, while two separate areas of fired clay fragments and ash were located near its center. Feature 47 was not excavated. Its location in conjunction with Features 44 and 45 is noteworthy (Figure 50).

Feature 48

This feature was not inside one of the squares that were completely shovel scraped and mapped. This large feature was visually obvious, however, and was drawn and mapped as an extension at the northwest corner of Square 9. The measured center was at 353.0 north and 157.5 east. Feature 2, which was excavated in 1969, intrudes on the western edge of Feature 48 (see Figure 5). The form of the latter was of a


Dark Brown Soil
Dark Brown Soil
Ash
Red Clay
F - 46

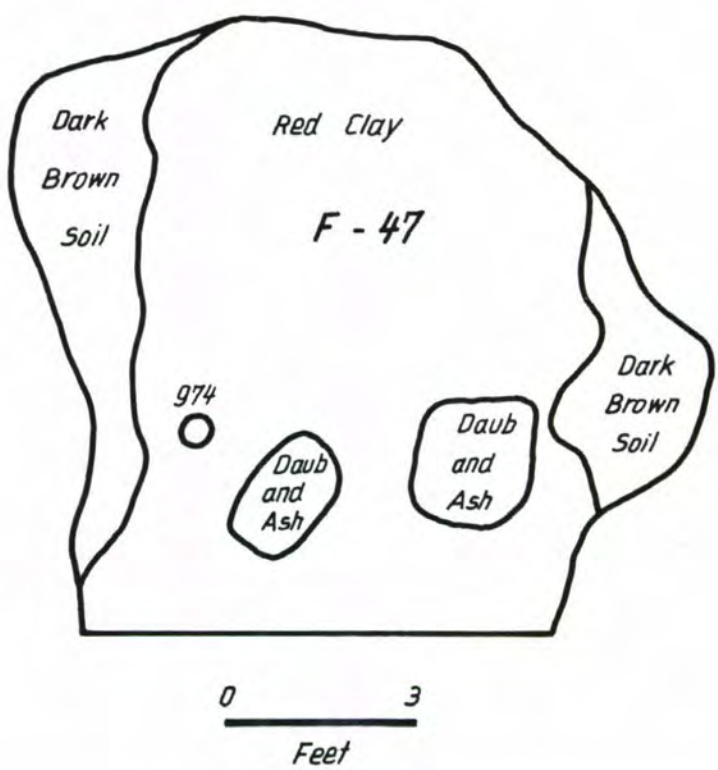

Dark
Brown
Soil
Red Clay
F - 47
Dark
Brown
Soil
974
Daub
and
Ash
Daub
and
Ash
0
3
Feet

Figure 33

large area of bright red clay with a border of dark humus on all but the northern edge. As with Features 1 and 42, Feature 48 was not detected at the time of discovery and excavation of Feature 2. The maximum length of Feature 48 was 10.0 feet in the grid north-south direction, while the width was 8.0 feet. This feature was not excavated and no artifacts were recovered.

Feature 49

Another feature found outside the area recorded by 50 foot squares in the summer of 1977 was Feature 49. It was readily apparent in the wake of the earthmover (as were many of the above described features). The location was northeast of Square 10 with the center at 381.0 north and 252.5 east. The form was of a large elongated area of bright red clay with a band of dark humus on the eastern, southern, and western edges (Figure 34). The overall length was 10.7 feet north to south while the width was 9.2 feet. Feature 49 was not excavated. A couple of post molds were noted just west of the feature.

Feature 50

Feature 50 was located with the aid of volunteers in early 1979 just before the site was flooded. This feature was found near the center of Square 14. Only the southern half of this square was recorded due to time and labor limits. The exact location of the center of the feature was 365.3 north and 227.5 east. The form was of a center area of bright red clay surrounded by a ring of dark brown-black humus (Figure 34). The humus was much wider on the northern side of the feature. The north-south diameter of this slightly elongated feature was 8.5 feet while the east-west dimension was 9.9 feet. One post mold intruded the

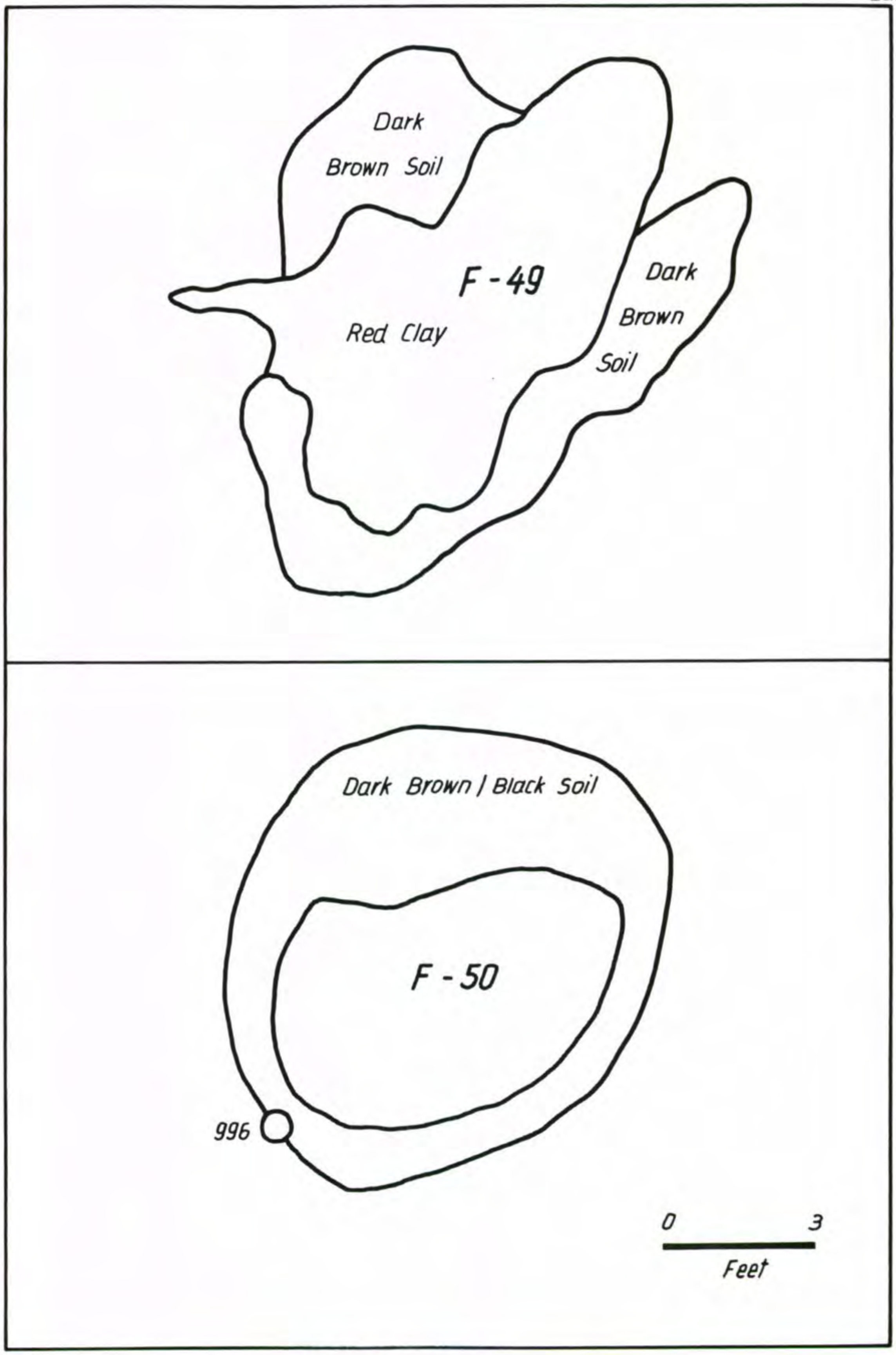

Dark
Brown Soil
F - 49
Red Clay
Dark
Brown
Soil
Dark Brown / Black Soil
F - 50
996
0
3
Feet

Figure 34

southwestern edge of the feature. No artifacts were noted and the feature was not excavated.

Feature 51

This feature was also located after the major work at the site was completed. Although the area of this feature was noted while shovel scraping and mapping of Square 2 was in progress, no feature number was assigned at that time. The form was of an indistinct patch of dark red clay distinct from the surrounding sterile red clay (Figure 35). In fact it is quite similar to the center portion of many features which had dark humus rings surrounding them but without the humus ring in this case. Eventually it was decided to give the area a feature designation based on its location in relation to other features. The area of this feature was very difficult to read and some hints of a humus ring may have easily been missed. The center of the feature was at 240.0 north and 121.0 east. The maximum north-south diameter of this oval area was 10 feet while the width was about 8 feet. The feature was not excavated and no artifacts were recovered.

Feature 52

This feature was in the southeast corner of Square 4 with its center at 200.6 north and 239.5 east. It had originally been labeled as a post mold (number 384), but later inspection made it clear that it should be called a feature. The form was of a small irregular patch of grey ashy soil (Figure 35). The maximum dimension was 3.2 feet in a grid east-west direction while the width exposed was only 1.1 feet. The feature went outside the square into the unscraped southern portion of

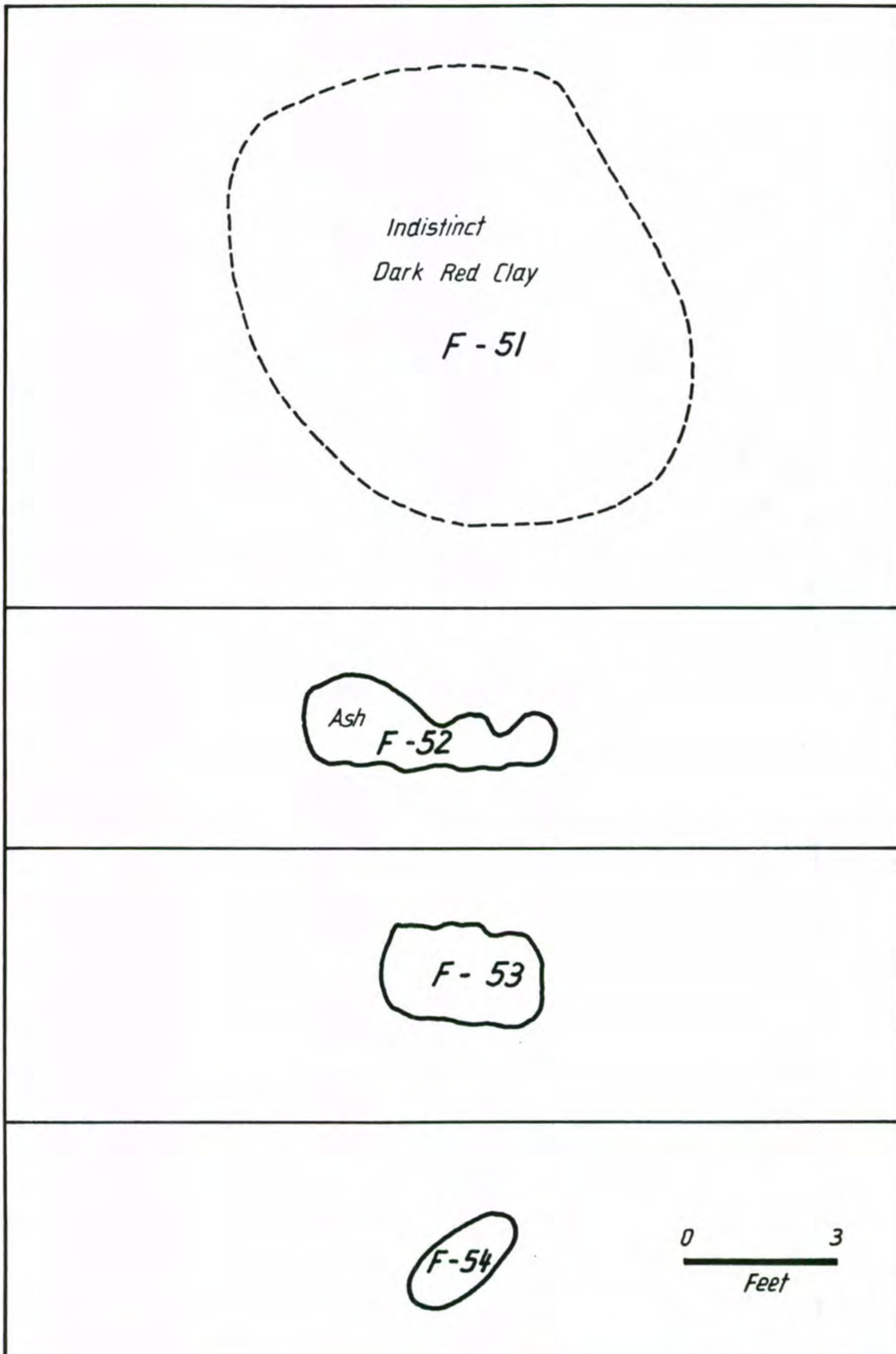



Figure 35

the site, however, and the true full size is unknown. The feature was unexcavated and no artifacts were recovered.

Feature 53

This feature was located at the west center part of Square 14 and oriented into the unmapped square just to the west. The exact center was at 377.2 north and 199.5 east. This feature was first noted prior to the 1977 stripping of the site in one of the roadscrapper cuts made in 1974. The feature was relocated and recorded in 1979 just before inundation. The form was of a small oval area of dark mottled humus (Figure 35). The maximum length was 3.0 feet in the grid east-west direction and 2.0 feet in the north-south direction. The feature was partially excavated in 1979 after it was relocated. The maximum depth of the shallow basin shaped pit was only .5 feet. No artifacts or other diagnostic items were recovered. No evidence of root stains appeared in the bottom of the feature. Also, no post molds were recorded around it due to lack of time for inspection.

Feature 54

This small feature was located in August of 1980 when low water in Lake Oconee re-exposed the site. Shovel scraping by the author and Marshall Williams revealed its presence in the south-center portion of Square 7. (The wooden stakes for the grid were still present on the site after having been under water thus exact locations were still able to be recorded). The center of the feature was at 262.7 north and 119.5 east. The conditions were not good for finding the limits of this feature. When Square 7 had been originally scraped and mapped in 1977 it was too dry to allow identification and when the feature was located in 1980, the area was too wet to allow accurate recovery. The only portion recorded was a small area of fired clay fragments with moderate amounts of charcoal included (Figure 35). The size was only 2.5 feet east-west and 1.0 feet north-south. The pile seemed identical to the other piles of fired clay fragments associated with the many bright red clay features on the site. As will be discussed in the following chapter, existence of one of these features at this location is highly likely. The feature itself was not excavated and no artifacts were recovered.

Feature 55

This feature is assigned to a large and obvious pattern of post molds found in Squares 2, 3, 6 and 7. The center of this feature was at approximately 262 north and 155 east, or in the southwest corner of Square 6. Feature 55 was not noted in the field as the individual 50 foot squares were being scraped and recorded, but only became apparent later when the maps were pieced together in the laboratory. The basic form is of a circular area of post molds about 50 feet in diameter. The circle was more of a band of posts rather than a neat simple circle (Figure 36). It is almost perfectly circular, however. The initial map of the circle had several gaps in the pattern. Consequently, the entire area of the circle was rescraped and remapped in February of 1978 by the author and Marshall Williams. The remapping found several new posts in critical locations of the circle and confirmed its existence. A few of the posts were excavated and were found to be leaning slightly outward from the center of the circle. Also several Bell Phase potsherds were found in the few excavated posts. No smaller features were found within the circle.

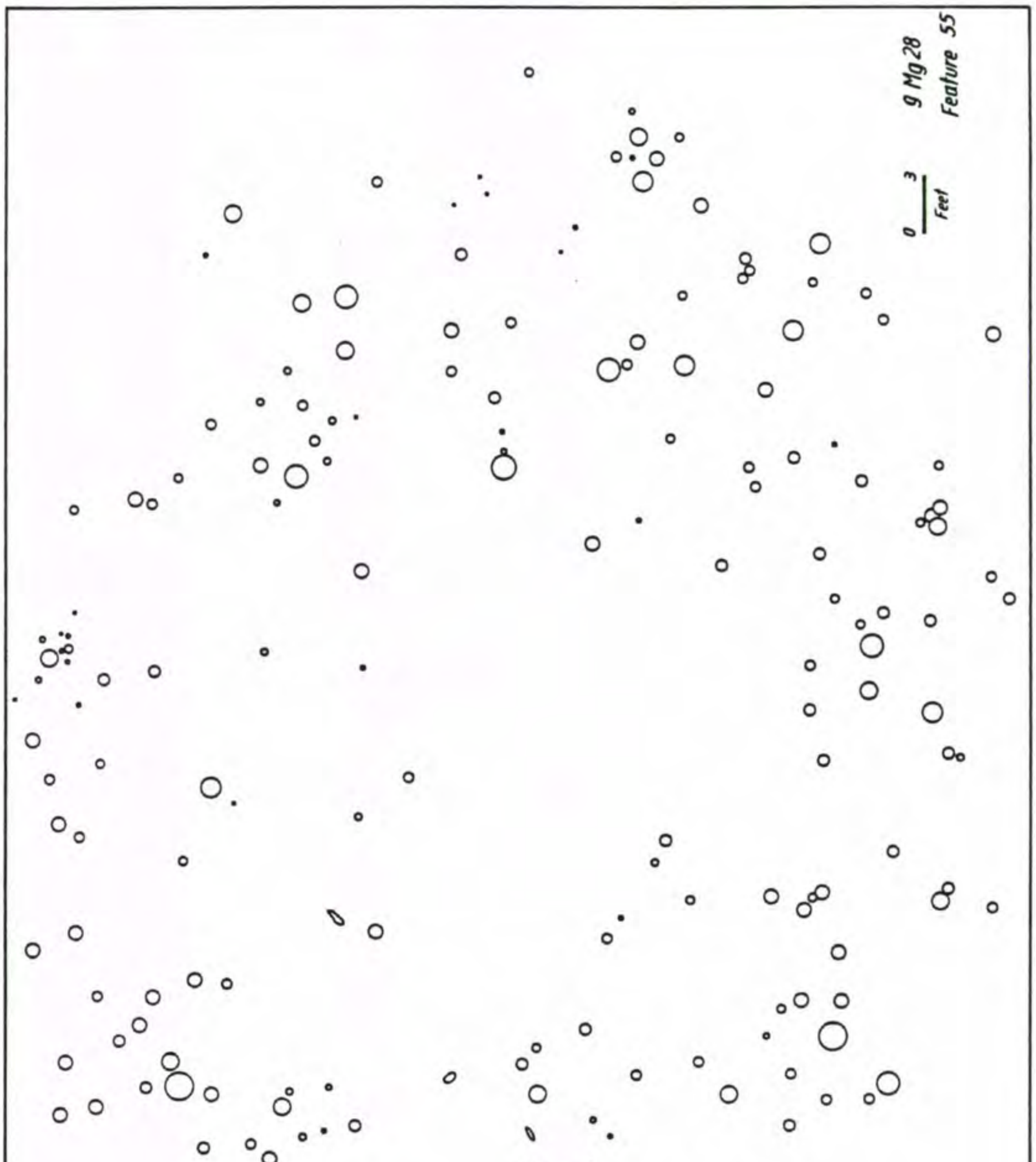



Figure 36

## CHAPTER 5

## FEATURE ANALYSIS

In the preceding chapter the forms of the 55 features found during the excavation of 9Mg28 were described in numerical sequence. In this chapter these features will first be arranged into classes which are similar in form, and then each class or feature type will be analyzed according to the possible use, meaning, and function of each. The grouping of the features into different classes was done by inspection. Where differences of form exist within a class these will be noted and discussed. Through the use of a residual category labeled "miscellaneous," all features are classified.

A total of seven classes of features are recognized from 9Mg28. Analysis and discussion of each of these classes will proceed independently, although reference to other feature types may often be necessary. Each class will be analyzed according to the following format. First, a summary of the form characteristics common to the groups, emphasizing key elements, will be presented. This will be followed by a review of possible multiple use explanations where the use is in doubt. The various problems with the different potential explanations will be outlined and ultimately a selection will be made. Ethnographic references will be liberally used to support the decision. Comparative archaeological data from other sites and areas will be used as necessary to aid explanations. Finally some speculations on the meaning and function of the features within a class will be posited.

Class I

The first feature type consists of three features--numbers 31, 34, and 36. The use of these is not in doubt, as each contained one human burial. All of the burials were in slightly oval pits averaging 3.6 feet long by 2.8 feet wide. The average depth of the feature was 1.3 feet although this varied widely. All burials were of adults, ranging in age from 18 to 40+. The sex of only one could be determined due to the general poor preservation, and this was a male. All the burials were tightly flexed and all were lying on their right sides. There was no pattern present in the orientation of the three burials, the heads being to the northeast, east, and west respectively. All three burials were in the area to the east of the rotunda (Feature 55) discussed below. Two of the burials contained no grave goods while one contained two European blue glass trade beads. The fill over all the burials within the pits was uniformly mottled brown with red clay inclusions. It is apparent that all three pits were dug just before the body was placed in the grave and were covered almost immediately with the mixed dirt removed from the hole. That the majority of the fill in the pit, which was uniformly surrounded by sterile red clay, was of an "A zone" humus type implies that the topsoil over the burial through which the grave was dug, was much thicker than at the time of archaeological excavations, even allowing for the stripping of the site. This is not surprising given the flooded and agriculturally eroded nature of the hill. There is no evidence that the pits were existing holes conveniently used for burial but instead were prepared just prior to burial. Feature 36 (Burial 1) was much shallower than the other two even though the features were all revealed at the same level. This suggests that no culturally set depth for a grave was necessary (such as our six feet depth standard) (Plate 3).

It should be noted that there were no multiple burials, no child or adolescent burials, and no extended burials on the site. The latter is not really surprising for flexed burials are the norm in many late period sites. Almost all of the historic burials at Macon Plateau, for instance, were flexed (Mason 1963:122).

Likewise, at Macon Plateau there was no preference given to orientation of the body according to the cardinal directions, all possible orientations having been used (Mason 1963:123). All pits at Macon were also of an oval shape. At the site of Childersburg in northeast Alabama, an 18th Century Creek site, almost all of the burials were flexed and in oval pits (DeJarnett and Hansen 1960). Seckinger (1975) believes the burial data for the King site (9F15) shows a correlation between sex and orientation, but this is not certain.

Extended and multiple burials were common at earlier periods, particularly in Mississippian sites to the West but do not appear commonly in late sites. The lack of child burials may be significnat in interpreting the social composition of the settlement. Indeed, the discovery of only three burials in a late period site of this size is surprising in and of itself. Villages of this size typically have many more burials. This may be a function of several possibilities. First, the site may have been occupied for only a very brief period of time--not long enough for many people to have died of natural causes. Second,

Plate 3 - Burial 1

the site may have been only impermanently occupied, with people residing only for brief periods of the year. Instead the site may well have had ceremonial functions. Third, only a very small population may have lived at the site. This seems unlikely considering the amount of feature activity known for the site, but the exact population size is difficult to estimate. Fourth, the dead from the village at 9Mg28 may not have all been buried at the site. Some may have been simply thrown in the Oconee River. Timberlake observed this to be a common pattern among the Cherokee (Williams 1927:90). Additionally, and perhaps more likely, individuals may have been buried in the ubiquitous small rock mounds that dot the hillsides in Piedmont Georgia. Adair says the dead are buried in this manner (Williams 1973:194). A large area of these is present on the hills overlooking 9Mg28 (Caroline Hunt, Personal Communication). Historic burials among the Cherokee have been located under similar small rock mounds in the Keowee Valley in South Carolina (Williams 1978). Sixth, and finally, more burials may have existed just outside the area stripped and mapped in the archaeological work. This can not be known now, however.

The lack of grave goods (with the noted exception of the two small beads with Burial 3, Feature 34) may have social significance in terms of social stratification. It is generally acknowledged that high status individuals in a ranked society usually have more expensive grave goods buried with them then do individuals of lower status within the same society. The lack of goods with the burials could have two possible interpretations. First, these may have been the remains of low status individuals in a ranked society. Secondly, this site may represent the remains of a society which was rather egalitarian and in which no one was given preferential treatment in death. There are other clues which point to this and the preferred explanation which will be discussed later. That no grave goods were present could reflect on the possibly precarious economic nature of the people's existence. A situation could have existed where but little or no energy could be expended on preparing the dead for their journey with manufactured goods. This seems unlikely, however, when the general abundance of the environment is considered. All this must be considered, however, in light of the fact that three burials are a very small number about which to posit such ideas.

The three burials at 9Mg28 were all located at the east end of the excavated portion of the site in relatively close proximity to one another. Although three is a low number to make any statements about, it appears that there was an intentional placement of these in the same, general area. This could be related to the common Southeastern Indian belief that related the east with life and birth (Hudson 1976:132). Features 34 and 36 do not intrude on any feature while Feature 31 intrudes the northwest edge of Feature 35. No features intrude on the three burial features. This may imply either that the exact locations of the three burials was known to the inhabitants for the entire remainder of the time they lived at 9Mg28 and construction activities which would have disturbed these dead were avoided or that they were buried late in the period of occupation of the site. It is noteworthy that no burials were placed in or immediately around the large, circular, communal structure (to be discussed in detail below as Class III) at the highest part of the site.

The only hint of clothing interpretable from the burials consists of the two glass beads found in the neck region of Burial 3 (Feature 34). Whether these were strung as a necklace or attached to a shirt of some sort is unknown. The preservation of all three burials was so poor that even if they had been fully clothed no evidence would have survived.

The physical anthropological details of the three burials are included in the previous chapter under the individual feature numbers and are not repeated here.

Class II

There are only three features assigned to this class, Features 2, 5, and 15. Feature 13 is similar in form, and perhaps use, but is located well south of the Bell Phase portion of the site. Because it dates to the earlier Duvall Phase, it will not be dealt with here.

These features can be called "trash features" for this is certainly what they contained. The form was of a fairly large pit, generally circular, filled with trash in the form of food residues (animal and plant) and fragments of broken ceramic vessels and pipes. The features were very slightly oval, the mean diameters being 7.8 feet (standard deviation = .7 foot) by 6.9 feet (standard deviation = 1.1 feet). The depths of the three features varied from .7 to 2.1 feet with the mean being 1.43 feet (standard deviation = .7 feet). There was also a wide variation in pit shape (which accounted for the differences in depth). Feature 2 was essentially a simple shallow basin while Feature 15 was a straight sided, flat bottomed, bowl shaped feature. Feature 5 combined these two forms, having a bowl of the type of Feature 15 placed in the center of a shallow basin like Feature 2 making Feature 5 the deepest of the three.

The shallowest of the features, Feature 2, had but one apparent depositional event, only one layer being evident. It was found at the same level as the deeper features. Feature 15 had at least six layers (1. brown top soil, 2. light white ash, 3. dark black soil + fired clay, 4. dark brown sand and fired clay lumps, 5. charcoal and fired clay, and 6. white ash) with varying amounts of garbage in each layer. Feature 5 had at least 12 layers, varying greatly in type of fill between layers, although charcoal and ashy midden seemed to be the most common. The estimated volume of Feature 2 was 15 cubic feet, that of Feature 15 was 45 cubic feet, while Feature 5 was at least 65 cubic feet in volume. The mean was 41.7 cubic feet (large standard deviation = 25.2 cubic feet).

All three features were intrusive into other features--all of which were Class IV features. Features 5 and 15 intruded into the north edge of Features 7 and 16 respectively while Feature 2 intruded the northwest edge of Feature 48.

There was a mean of 799 pottery sherds in each feature (standard deviation = 505). Feature 2 contained 746, Feature 5--1328, and Feature 15 had only 322 sherds. The sherds of Feature 2 weighed 32.77 pounds, those of Feature 5 weighed 50.61 pounds, while Feature 15's sherds totaled 10.02 pounds. The mean weight was 31.13 pounds (standard deviation = 20.34 pounds). These figures yield the following results. The mean sherd size for Feature 2 was .044 pound (.7 oz), for Feature 5--.038 pound (.6 oz), and for Feature 15--.031 pound (.5 oz). These figures will be compared with similar figures in other feature classes shortly. The mean weight for all sherds in this feature class is .038 pound (.6 oz). The sherd density by feature can be computed by dividing the number of sherds in a feature by the estimated volume for that feature. This yields a figure of 49.7 sherds per cubic foot for Feature 2, 20.4 for Feature 5, and 32.1 for Feature 15. The mean for all three features was 34.0 sherds per cubic foot (standard deviation = 14.75 sherds).

Feature 2 contained the remains of at least 16 reconstructable ceramic vessels with a mean fragment portion of 24.1 percent of a complete vessel (standard deviation = 23.4%). Feature 5 had 29 reconstructable fragments with a mean portion of 22.4 percent (standard deviation = 24.8), while Feature 15 had only six reconstructable fragments with a mean vessel proportion of 26.6 percent (standard deviation = 39.7 percent). The overall figures for this class are a mean of 17 reconstructable fragments (standard deviation = 11.5 vessels) with a mean proportion of 24.4 percent (standard deviation only 2.1) of each vessel present. The mean vessel fragment size of 24.4% present is the lowest of any feature class containing pottery. Further comparisons of these statistics are discussed with Class VI below where several patterns are evident. In general it may be said that these statistics tend to validate the separation of the features along the form lines selected.

A total of 2950 animal bone fragments were recovered from Feature 5, while only 227 were found in Feature 15. The quantity from Feature 2 is unknown as it was not carefully screened in 1969. Feature 5 had 45.4 bones per cubic foot while Feature 15 was only 5.04 bones per cubic foot. All these features had moderately large quantities of shellfish remains, both bivalves (clams) and univalves (snails).

Small quantities of plant food remains were found in all three features. Corn fragments (cob, cupules, and kernels) were found in Features 5 and 15 along with peach pits. River cane and an assortment of wild seeds were also found in Feature 5 and a small quantity of charred hickory shell was located in Feature 15. No beans or squash were located in these or any other features on the site. Details of the floral remains from the site are discussed in the chapter on subsistence. The largest quantity of this material, rare though it is, comes from this class of features.

There seems to be little doubt that the fill associated with this class of features can best be described as "trash". The artifactual remains are generally small and broken fragments discarded by the people. Quantities of food remains, both plant and animal, are included with the broken artifacts. Additionally, quantities of ash and charcoal, probably the result of the cleaning of fire pits, were deposited along with the other garbage. Items were apparently not placed in these features with any design or care and were apparently simply dumped or thrown into the holes.

Ethnographic details of trash deposition in the southeast are rare to non-existent. This is not too surprising when it is realized that "taking out the garbage" is among the most mundane behaviors human perform. Patterns of garbage disposal are almost completely unrecorded even in our own culture. Archaeologically, however, a very interesting pattern change can be observed for the southeast U.S. During the major portion of the Mississippian Period in the southeast, garbage deposition was generally accomplished in simple above ground dump areas, often simply scattered around the outside of houses, but away from the plaza areas. These midden areas had no sharp or clear cut boundaries or limits and deposition would gradually diminish in thickness as the distance from the living area increased. No special pits for garbage accumulation were known or used, and the pattern of general village midden is clear.

This garbage deposition pattern was in general use in Lamar period cultures of Georgia in general and in the Duvall and Dyar Phases in particular for the Wallace Reservoir Area. Beginning in Wallace with the Bell phase at about A.D. 1600, and in other parts of the state and adjacent areas, a transition to the use of special garbage pits of the type described here took place. In fact, this transition closely correlates with the end of mound construction for most of the area.

These trash pits are almost always circular and range from as little as three or four feet to as much as ten or more feet in diameter. They range in depth from one to three feet or so and generally have flat or gently rounded bottoms that are usually quite regular. They are known from both 18th century Cherokee (38OC3, the historic lower Cherokee town of Toxaway), and Creek sites such as 9Tp9--the town named Okfuskenena, on the Chattahoochee River (Williams, Personal Communication, Huscher 1972). In all instances these pits are filled with black midden of high organic content, charcoal, ash, fragments of broken pottery vessels (rather than only small sherds), animal bone and plant remains. Sometimes there is evidence of build up of different depositional episodes and sometimes it appears that the deposition was in one brief period. Where ever these have been found they have been excellent sources for the recovery of material culture items in a primary depositional context.

The most obvious question about these trash pits is this: why would Indians adopt a pattern of trash deposition which would involve excavating into sterile soil a sizable hole for the deposition of garbage? On many sites, especially 9Mg28, the subsoil is a very tough, hard clay and would require a great deal of labor to dig the required holes. In fact, the subsoil at 9Mg28 would be difficult to dig using metal picks and shovels (the excavation crew at the site would attest to this to a person!) much less using the wood and stone implements available to the Indians.

A number of options are available to anyone disposing of food debris and other garbage. The material could be just left to lie where it falls. Generally this is the first step, but most sedentary people, sooner or later, collect this material and redeposit it somewhere else (Murray 1980:498). Often in the Southeast it was simply swept outside the houses and allowed to accumulate near the door. It may be placed in an individual garbage collection point for a single house or it may be taken to a community garbage area or dump.

Garbage and food residues standing in the open sun are excellent food sources for countless vermin and bacteria. As the material is biochemically broken down strong odors are released. In many cultures, ours included, these odors are culturally defined as offensive and the standard solution is to either remove the garbage from living areas as discussed above or to bury it in the ground to prevent the odors from reaching the air. At first it might appear that the use of trash pits at late sites, such as 9Mg28, in the southeast might be for this reason.

Ethnographic accounts, however, often describe the villages of Indians in this area as being extremely foul smelling, although the natives evidently did not consider it offensive. The long tradition of living near or even on top of rank garbage piles (nothing smells worse than a decaying shell midden!) in the archaeologically known Southeast supports the idea that these smells were culturally defined as inoffensive to the native southeastern Indians. Thus it is difficult to believe that the people at 9Mg28 would have gone to the trouble to dig holes right in their village just to put trash into them. This leads to a logical conclusion that these pits may well have been dug for other purposes and simply used later as convenient places to put their garbage, perhaps burning it in them. The fact that pits such as Feature 5 - with its symmetrical cross section, bench like shelf, and smoothly rounded bottom - existed is here taken as evidence to support this idea. A similar shaped feature at 9Tp9 (Feature 113) on the Chattahoochee River between Georgia and Alabama has a circling ring of post molds which must have related to some structure built over the pit. That this structure was part of a garbage disposal pattern seems improbable (Huscher 1972).

If many of these trash filled pits were not dug just to receive garbage, what then were they dug for in the first place? There are at least two possibilities. The first of these is the idea that the pits may have been initially excavated as borrow pits in the process of obtaining the red clay of the hillside itself for construction purposes, perhaps as daub for house construction activities. This idea entails at least three problems, however. First, there is no need to sculpt the pits, as was done, if the goal was simply to dig a hole and use its clay contents. The form a borrow pit would probably take would be far more random and probably asymmetrical if this was the actual use for the initial pit. Secondly, there are sites where pits of this type are dug into alluvial river bottom silts (rather than clay). 38OC3, a lower Cherokee site in Oconee County, South Carolina, is such an example (Williams, Personal Communication). Silts and sand removed from such a pit would have virtually no technological value to these people and makes the argument for clay borrow pits somewhat suspect. A third objection involves the generally impracticality from a safety point of view, of having large open holes all over a village.

This last observation probably explains another reason why the features were later filled with trash--it represented the easiest way to fill these "hazards" and get the garbage out of the house (but not out of smelling distance since that did not matter to them).

Barring the idea of the holes being dug as borrow pits for the moment, another possibility suggests itself. This is the idea that these holes were dug as the below ground portion of small, circular, semi-subterranean structures, possibly individual winter dwellings. Of all the possibilities dealt with thus far, this makes the most common sense. Certainly structures of this sort were known in the southeast in historic times.

Rather than describe these in greater detail now, however, further discussion of this likelihood will be postponed until discussion of feature Class IV because the shape of the features in that class are quite similar to the ones in this class and the two may have a common origin.

Class III

This group actually consists of only one feature--Feature 55. This, as briefly discussed in the previous chapter, is a large, circular post pattern some 45 feet in diameter and located on the highest part of the site. The form of this circle is admittedly very crude and irregular, but there is little doubt that in the context in which it is situated, this must represent the remains of a large structure of some sort. Any clear pattern is confused by much rebuilding and the fact that some of the stains are undoubtedly the remains of pine tree tap roots. Time did not permit the excavation of but a few posts in this area.

Post diameters varied widely, the largest being over a foot in diameter. No specific area can with certainty be designated as an entrance, although the largest gap is in the northeast side of the structure. The spacing of posts around the circumference is quite uneven, almost random within a band about seven to nine feet wide. There are a few scattered small to medium sized post molds in the center area but no pattern is evident.

Large circular structures are well known in both the archaeological and ethnohistoric literature in the Southeast as "rotundas". These were large communal buildings of several construction types, but all being about 40-50 feet in diameter and circular in shape.

Possibly the earliest ones in Georgia are the earth covered circular lodges found at Macon Plateau, an early Mississippian site. The famous reconstructed earthlodge at Macon (Fairbanks 1946) was radiocarbon dated to A.D. 1015 (Wilson 1964). Four of the series of nine Macon lodges discussed by Fairbanks, including the reconstructed one, had large central support posts (1946:101). Seven of the nine had central fire pits and at least seven of the nine also were earth covered.

Circular structures were included with square buildings on the surfaces of substructure platform mounds somewhat later in the prehistoric southeast. Several circular buildings, again of substantial size, were built on the Hiwassee Island Mound in East Tennessee, a Dallas Phase site (Lewis and Kneberg 1946:70-71).

By the 18th century, when most of our ethnographic information was recorded, circular council houses or rotundas were generally no longer on mounds, as mound construction had ceased before 1600 except in a few parts of the Cherokee country. William Bartram, describing his 1776 visit to the Cherokee town of Cowe writes:

> The council or town-house is a large rotunda, capable of accomodating several hundred people: it stands on the top of an ancient artificial mound of earth, of about twenty feet perpendicular, and the rotunda on the top of it being above thirty feet more, gives the whole fabric an elevation of about sixty feet from the common surface of the ground. (Van Doren 1955: 297).

James Adair, perhaps in reference to these houses on mounds adds:

> Every town has a large edifice, which with propriety may be called the mountain house, in comparison of those already described. But the only difference between it, and the winter house or stove, is in its dimensions and application. It is usually built on the top of a hill; and, in that separate an imperial state house, the old beloved men and head warriors meet on material business, or to divert themselves, and feast and dance with the rest of the people (Williams 1973:453).

There are many descriptions of the construction details of these civic rotundas in the ethnohistoric literature. Bartram describes the Cherokee house as follows.

> The rotunda is constructed after the following manner: they first fix in the ground a circular range of posts or trunks of trees, about six feet high, at equal distances, which are notched at top, to receive into them, from one another, a range of beams or wall plates; within this is another circular order of very large and strong pillars, about twelve feet high, notched in like manner at top, to receive another range of wall plates; and within this is yet another or third range of stronger and higher pillars but fewer in number, and standing at a greater distance from each other; and lastly, in the centre stands a very strong pillar, which forms the pinnacle of the building, and to which the rafters centre at top; these rafters are strengthened and bound together by cross beam and laths, which sustain the roof or covering, which is a layer of bark neatly placed, and tight enough to exclude the rain, and sometimes they cast a thin superficies of earth over all. There is but one large door, which serves at the same time to admit light from without and the smoak to escape when a fire is kindled; but as there is but a small fire kept, sufficient to give light at night, and that fed with dry small sound wood divested of its bark, there is but little smoak. All around the inside of the building betwixt the second range of pillars and the wall, is a range of cabins or sophas, consisting of two or three steps, one above or behind the other in theatrical order, where the assembly sit or lean down; these sophas are covered with mats or carpets, very curiously made of thin splints of Ash or Oak, woven or platted together; near the great pillar in the centre the fire is kindled for light, near which the musicians seat themselves, and round about this the performers exhibit their dances and other shows at public festivals, which happen almost every night throughout the year. (Van Doren 1955:298).

This form is thus of three concentric circles of posts with a single center post. The roof poles angle up over the structure formed by the concentric outer rows of posts with logs laid over their tops.

Bartram says this of the Creek rotunda at Tuccabache.

> The great council house or rotunda, is appropriated to much the same purpose as the public square, but more private, and seems particularly dedicated to political affairs; women and youths

> are never admitted; and I suppose, it is death for a female to presume to enter the door, or approach within its pale. It is a vast conical building or circular dome, capable of accomodating many hundred people; constructed and furnished within, exactly in the same manner as those of the Cherokees already described, but much larger than any I had seen of them: there are people to take care of it, to have it daily swept clean, and to provide canes for fuel, or to give it light. (ibid:357).

James Adair gives the following detailed description of a small rotunda, in this case designed for a family rather than the whole village. The village rotunda, as mentioned in the quote from him above, is similar to the following outline, but simply larger. The quote is presented in its entirety because it provides one of the best descriptions of the construction and use details available.

> The clothing of the Indians being very light, they provide themselves for the winter with hot-houses, whose properties are to retain, and reflect the heat, after the manner of the Dutch stoves. To raise these, they fix deep in the ground a sufficient number of strong forked posts, at a proportional distance, in a circular form, all of an equal height, about five or six feet above the surface of the ground: above these, they tie securely large pieces of the heart of white oak, which are of a tough flexible nature, interweaving this orbit from top to bottom, with pieces of the same, or the like timber. Then, in the middle of the fabric they fix very deep in the ground, four large pine posts, in a quadrangular form, notched a-top, on which they lay a number of heavy logs, let into each other, and rounding gradually to the top. Above this huge pile, to the very top, they lay a number of long dry poles, all properly notched, to keep strong hold of the under posts and wall-plate. Then they weave them thick with their split sapplings, and daub them all over about six or seven inches thick with tough clay, well mixt with withered grass: when this cement is half dried, they thatch the house with the longest sort of dry grass, that their land produces. They first lay on one round tier, placing a split sapling a-top, well tied to different parts of the under pieces of timber, about fifteen inches below the eave: and, in this

> manner, they proceed circularly to the very spire, where commonly a pole is fixed, that displays on the top the figure of large carved eagle. At a small distance below which, four heavy logs are strongly tied together across in a quadrangular form, in order to secure the roof from the power of envious blasts. The door of this winter palace, is commonly about four feet high, and so narrow as not to admit two to enter it abreast, with a winding passage for the space of six or seven feet, to ensure themselves both from the power of the bleak winds, and of an invading enemy. As they usually build on rising ground, the floor is often a yard lower than the earth, which serves them as a breast work against an enemy: and a small peeping window is level with the surface of the outside ground, to enable them to rake any lucking invaders in case of an attack. As they have no metal to reflect the heat; in the fall of the year, as soon as the sun begins to lose his warming power, some of the women make a large fire of dry wood, with which they chiefly provide themselves, but only from day to day, through their thoughlessness of tomorrow. When the fire is a little more than half burnt down, they cover it over with ashes, and, as the heat declines, they strike off some of the top embers, with a long cane, wherewith each of the couches, or broad seats, is constantly provided; and this method they pursue from time to time as need requires, till the fire is expended, which is commonly about day-light. While the new fire is burning down, the house, for want of windows and air, is full of hot smoky darkness; and all this time, a number of them lie on their broad bed places, with their heads wrapped up. (Williams 1973:450-452)

This type of construction, with the four large center posts, is similar to that of the Macon Plateau structures, although the late ones described by Adair were not earth covered as those at Macon surely were.

It would appear that some descriptions of the construction of these rotundas imply that the task could be performed with no center supports at all. The first description is by Hitchcock as related by Swanton (1928:179-180). Swanton sets up the description as follows.

> Hitchcock's notes contain a short description of the Tuabahchee tcokofa erected after the emigration

of the Creeks to the banks of the Canadian. He calls this building "the Round house," and says:

> Considerable ingenuity has been employed in its erection. The main structure is supported upon twelve posts or pillars, one end sunk in the ground. They are disposed in a circle about 9 or 10 ft. apart, making a space within of about 120 ft. circumference, in the centre which, upon the ground, is the sacred fire. The roof over this circle is a cone terminating in a point over the fire some 20 odd feet high. The rafters extend down from the apex of the cone beyond the twelve pillars, which are about 9 ft. high, to within 4 or 5 ft. of the ground, which space, of 4 or 5 ft., is closed entirely with earth. Between the pillars and the extreme enterior, a space of several feet, are seats of mats, like those of the sheds [in the Square]. The manner of constructing the roof is very remarkable for Indian work. Upon the alternate couples of the 12 pillars are first placed horizontal pieces resting upon the second set, but drawn within towards the centre of the circle a few inches. Upon these again are other pieces still more drawn in. There are 4 tiers of horizontal pieces thus placed upon each other.
>
> A, b, c, d, are four of the twelve pillars. Pieces are first laid upon ab and upon cd, then a piece upon these and between bc, etc., etc. These horizontal pieces are strongly bound together by leather thongs of green hide. They are only carried up to the number of 4 sufficient for giving a direction and a foundation for the rafters, which are laid upon these, extending up to a point in one direction and in the other direction over [the] outside nearly to the ground. The rafters are strongly bound by thongs and covered with ordinary rived boards for shingles. There is but one small entrance to the House which is next towards the angle of the square adjacent to which the Round House stands. (ibid:179:180)

Swanton adds the following footnote to the above description:

> It seems that the architect was Tukabahchee miko, a well-known Upper Creek leader and at that time its leading medicine maker. After giving the dimensions of the building as 'about 60 feet in diameter and 30 feet high,' he says that Tukabahchee miko 'cut sticks in miniature of every log required in the construction of the building, and distributed them proportionately

> among the residents of the town, whose duty it was to cut logs corresponding with their sticks, and deliver them upon the ground appropriated for the building, at a given time. At the raising of the house, not a log was cut or changed from its original destination, all came together in their appropriate places, as intended by the designer. During the planning of this building, which occupied him six days, he did not partake of the least particle of food. (ibid:179)

The diameter of this structure would be just under 40 feet and note that only twelve posts, each ten feet apart were all that was necessary to support the entire structure. This type of construction would be very similar archaeologically to Feature 55 at 9Mg28. Many of the additional posts found could have been props added as the structure aged somewhat.

Additional reference to a rotunda built without the aid of center posts is the famous description by Benjamin Hawkins of a Creek rotunda made in the late 1790's. His description reads as follows:

> Chooc-ofau thluc-co, the rotunda or assembly room, called by the traders, 'hot-house'. This is near the square, and is constructed after the following manner: Eight posts are fixed in the ground, forming an octagon of thirty feet diameter. They are twelve feet high, and large enough to support the roof. On these, five or six logs are placed, of a side, drawn in as they rise. On these, long poles or rafters, to suit the height of the building, are laid, the upper ends forming a point, and the lower ends projecting out six feet from the octagon, and resting on posts five feet high, placed in a circle round the octagon, with plates on them, to which the rafters are tied with splits. The rafters are near together, and fastened with splits. These are covered with clay, and that with pine bark; the wall, six feet from the octagon, is clayed up; they have a small door into a small portico, curved round for five or six feet, then into the house.
>
> The space between the octagon and the wall, is one entire sopha, where the visitors lie or

> sit at pleasure. It is covered with reed, mat or splits.
>
> In the centre of the room, on a small rise, the fire is made, of dry cane or dry old pine slabs, split fine, and laid in a spiral circle. This is the assembly room for all people, old and young; they assemble every night, and amuse themselves with dancing singing, or conversation. And here, sometimes, in very cold weather, the old and naked sleep.
>
> In all transactions which require secrecy, the rulers meet here, make their fire, deliberate and decide. When they have decided on any case of death or whipping, the Micco appoints the warriors who are to carry it into effect; or he gives the judgment to the Great Warrior , (Tustunnuggee thlucco,) and leaves to him the time and manner of excuting it. (Hawkins 1848: 71-72)

This description is ofamultiple concentric ring of post approach much like Bartram's description, but, again, with no center supports. If the roof structure were light through the use of fairly small saplings extending over the center floor area, the engineering of this sort of structure is quite feasible. Of additional interest in Hawkins' description is the reference to the central fire place being "on a small rise". If this were the case at 9Mg28, then there would be no archaeological evidence of a fire pit in the center due to the extensive plowing and flooding of the site over the years. The original floor level of the rotunda and any associated fire place "on a small rise" would have been destroyed. The post mold pattern of Feature 55 was probably at least 8 inches to a foot below the original floor level. An additional ethnohistoric reference to a raised fire place in a rotunda comes from George Washington Grayson, a 19th century Coweta Creek. His description is interesting in its own right and is included here.

> tusk ofu, was a house or cabin made of logs or poles and daubed with clay from the ground to top so that timbers were invisible and wind or cold could not reach the occupants. For floor, a properly tempered kind of clay was put down which then dry did not crumble into dust. In the centre of this floor was an elevation of the clay, of some 4 or 5 inches of proper size called totkinleiku on which the fires were built. They usually procured for this fire fuel that consisted simply of the dry and seasoned branches of the Black-Jack oak which do not make much smoke, for there was no hole for the smoke to go out through. This warmed the room and kept all within comfortable for the night or day. (Sturtevant 1968:3)

Certainly Hawkins' "small rise" is equivalent to Graysons' "4 or 5 inches". It is interesting to note, however, that while Hawkins spoke of cane and pine as fuel for the fire Grayson spoke of blackjack oak as the fuel due to its lack of smoke.

Townhouses were present often even at very small villages among the Creeks. Hawkins tells us in his letters: "I arrive at Atchina Hatche (Cypress Creek), a village of Keolgee, there are six habitants and a small town house, some thriving peach trees" (Hawkins 1916:34). There is some doubt whether Hawkins meant a rotunda like structure when he mentioned a "town house" in the above letter. In his "A Sketch of the Creek Country" (1848:68) he equates the term "town house" with the four square buildings facing the open square ground and each other, a form also found on most Creek sites. Most other ethnographers use the term "town house" to mean the rotunda. The following quote from Timberlake on the rotunda at the Cherokee town of Chota makes this clear.

> The town-house, in which are transacted all public business and diversions, is raised with wood, and covered over with earth, and has all the appearance of a small mountain at a little distance. It is built in the form of a sugar loaf, and large enough to contain 500 persons,

> but extremely dark, having, besides the door, which is so narrow that but one at a time can pass, and that after much winding and turning, but one small aperture to let the smoak out, which is so ill contrived, that most of it settles in the roof of the house. Within it has the appearance of an ancient amphitheatre, the seats being raised one above another, leaving an area in the middle, in the center of which stands the fire; the seats of the head warriors are nearest it. (Williams 1927:59)

Archaeologically, features of this sort are known from both Cherokee and Creek sites. In fact the actual feature described by Timberlake above has been excavated at the site of Chota. This one had large posts in the interior. At the Creek site of Okfuskeneena on the Chattahoochee River in Georgia (9Tp9) two, possibly three, of these round structures were found. The post patterns at 9Tp9 were unclear like those from 9Mg28, but the basic arrangement was there. The first rotunda at 9Tp9 was just under 50 feet in diameter. Huscher in his description of it says:

> X-9 at the Burnt Village uncovered a circular arrangement of post holes which can be identified with considerable confidence as a late Creek Rotunda - that is the tcokofa, hot house, big house, or council house of the historic documents. ...There was no certain ascertained entrance, but a suggestion of some sort of elaborated doorway seems most probable on the west side of the circle. There were three closely adjacent center hearth pits which identified that the central hearth had been redug at least three times. (Huscher 1972:34-35).

The use of the structure represented by Feature 55 at 9Mg28 was for a shelter for a moderate number of people. With its roof, walls, and probable fire place it would have provided warmth during cold nights in spring and fall as well as winter days and nights. One gets the impression from the historical literature that the Cherokee rotundas may have been a little more substantial in the 18th century than those of the Creeks. This may relate to the differences in latitude for the respective groups, with the former being more northerly and perhaps colder in winter for a longer period of time.

In understanding the meaning and social function of a structure of this sort it must be understood that the rotunda was not intended to be a place just to keep warm. Many social functions took place there and in the minds of the people these probably took precedence over the shelter aspects. Local political and social decisions were hammered out here among the villagers. Black drink may have been routinely consumed by people in the rotunda. This functioned as a communal and individual purifying agent and certainly had meaning in terms of their belief system. Games and recreation--story telling, singing and dancing, as well as news gossiping all took place under the roof of the rotunda and were further social functions of it. The rotunda was a central focus point, a symbol of social unity for the people and thus functioned as a critically important part of the daily lives of the people. The hustle and bustle of life and activity within the walls must have been hardto resist. Certainly most European visitors to these villages write of their visits to the rotundas as the high point of their visits.

The meanings of a structure such as the rotunda at 9Mg28 are certainly multiple. A definite degree of cooperation was necessary to construct a structure of this type. Certainly a great deal of labor was involved in cutting timbers, transporting them, constructing the walls and roof, and then finishing the exterior. Probably every able person in the village was involved. A circular form is somewhat egalitarian in and of itself. Except for the very center of the room (where the fire would have been) no place is the obvious "natural" focus for one's attention. Any seat was a good seat from which to speak or be heard. There is some confusion in the ethnohistoric record about the admittance of women and children to the rotunda, although most accounts would permit both to be admitted at least some of the time.

At the height of Mississippian times several hundred years earlier than the occupation at 9Mg28, when the societies were still complex chiefdoms, the egalitarian nature of the rotunda was probably less important than in later times when these chiefdoms had lost their centralized power. In this regard it would appear that the rotundas were probably at their height of importance in the 17th and 18th centuries. There should be little doubt that Feature 55 was the social, political, and religious center of the little community of people who lived at 9Mg28.

Class IV

The features represented by Class four are both the most numerous and the most difficult to understand. The features assigned to this class are 6, 7, 8, 9, 10, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 32, 33, 35, 38, 39, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, and 54. A few of these are extreme examples and might not belong in the class. The majority, however, do form a reasonably similar group of features (Plates 4 and 5).

The basic form as seen from the surface of the shovel scraped feature is of an irregular but generally circular shaped feature of bright red clay surrounded by a band of dark soil or humus of highly

Plate 4 - Feature 43

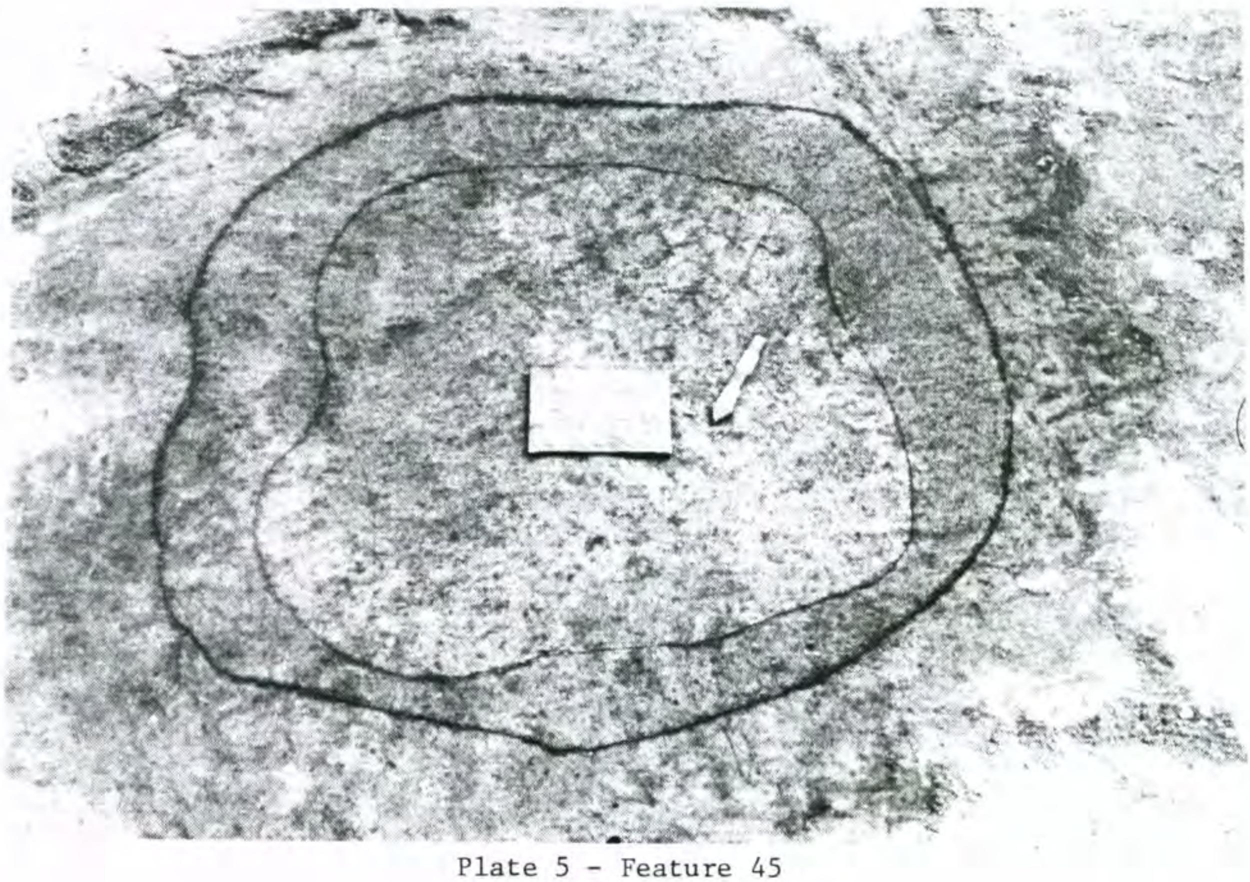


Plate 5 - Feature 45

variable width. The mean north-south and east-west diameters of all these features are 10.3 feet (standard deviation = 2.8 feet) and 9.2 feet (standard deviation = 1.9 feet) respectively. The depth of these features was recorded only on Features 8, 9, 10, 16, and 45 (although a depth of 1.9 feet was recorded for Feature 23, the bottom was probably not reached). For this sub-group, which are certainly typical of the class on other characteristics, the mean depth was 2.8 feet (standard deviation = .3 feet). The depth of these features was slightly more consistent than their lengths and widths. The Coefficient of Variation is the standard deviation divided by the mean (Blalock 1972:88). The larger the coefficient, the larger the variation. For the large and small diameter of these features the Coefficient of Variation (V) equals .27 and .21 respectively. For the depth of these features V = .10.

A total of 44% (15 out of 34) of the features had small to medium sized areas of fired clay or daub included in the central red clay area. Most of these daub piles were slightly off center, generally toward the north. A full 87% of the features had exposed brown humus areas (30 out of 34). In fact, for those which had no exposed brown humus area their identification as features was quite difficult. The center red clay in those features with or without the brown humus ring was a much brighter, more vivid red clay than the standard sterile red clay at that level on the site. Four patches of this bright red clay, because of their visual similarity to the others, were included here as features. None were excavated, but their identification is reasonably confident. The sterile red clay did not vary much in color over the site, appearing as a dull red-brown clay.

With those excavated used as examples based upon their diameters and recorded depths, it was possible to estimate the volumes for these features. The estimated below - surface volumes ranged from a low of only 85 cubic feet to a high of around 500 cubic feet. The mean volumes for all these features is estimated at 200 cubic feet.

On several features the humus band completely encircled the center red clay while on a greater number the humus ring was incomplete, occasionally consisting only of small patches of the medium dark brown material.

The form of the excavated features was consistently a simple, straight sided bowl with a generally flat bottom. The bottom curved gently into the vertical sides. The stratigraphy in these features clearly showed that the "ring" of humus exposed on the surface lined these basin shaped features while the bright red clay overlay filled the humus lined pits. In those features which had a daub pile included in the surface exposure, the daub was fairly tightly restricted to that area and the depth of this daub was never over 1/3 of the depth of the feature. The humus layer at the bottom of the feature was generally thin, never more than a few inches thick. The contact zone between the dark humus at the bottom of the features and the sterile clay beneath was often difficult to follow, although much of this difficulty must be blamed on the hard baked condition of the soil. After several days exposure to the sun the soil was like concrete and was removed with difficulty even with the application of water. No additional features were located in the bottoms of any of the features (Plates 6 and 7).

Daub samples recovered from piles in the excavated features, as well as samples taken from several otherwise unexcavated ones all have

Plate 6 - Feature 9, After Excavation

Plate 7 - Feature 10, After Excavation

common characteristics. Most fragments have the impressions of small logs on their surfaces. These concave impressions were apparently made from small three to five inch diameter trees. The general pattern is of a smooth bark with striations perpendicular to the length of the logs. The only trees which readily suggest themselves with this bark pattern are beech and cherry, although the bark patterns on sapling trees of other hardwood species could possibly appear similar. The wood does not appear to be pine.

Additionally, a few daub samples from Features 8, 9 and 10, the only ones that were completely excavated, bear the impression of two adjacent logs. All of the specimens of this sort have a curious pattern. The two adjacent logs to which these specimens had been plastered were not parallel to one another, but were at an angle of 10 to 20 degrees. The daub was apparently covering the ends of these logs just before they would have joined (Plate 8). The structural form that could best account for this pattern is one in which the clay was packed over the center of a radial structure, in all probability a conical shaped roof. Since the fire-hardened clay was restricted to a small area at the top of the features, it is suggested that the only fired clay in these features was near or at the point where the timbers joined in the center of a radiating pattern. Any smoke and heat from within these small structures would rise toward this area and a small center smoke hole would have been necessary. As heat rose toward a smoke hole it would have been accelerated in much the same way a carburetor speeds up the flow of a gas air mixture on its way to be ignited in the cylinders of an automobile's engine. This carburetor effect would cause the heat at and immediately around the smoke hole to be quite intense and, over

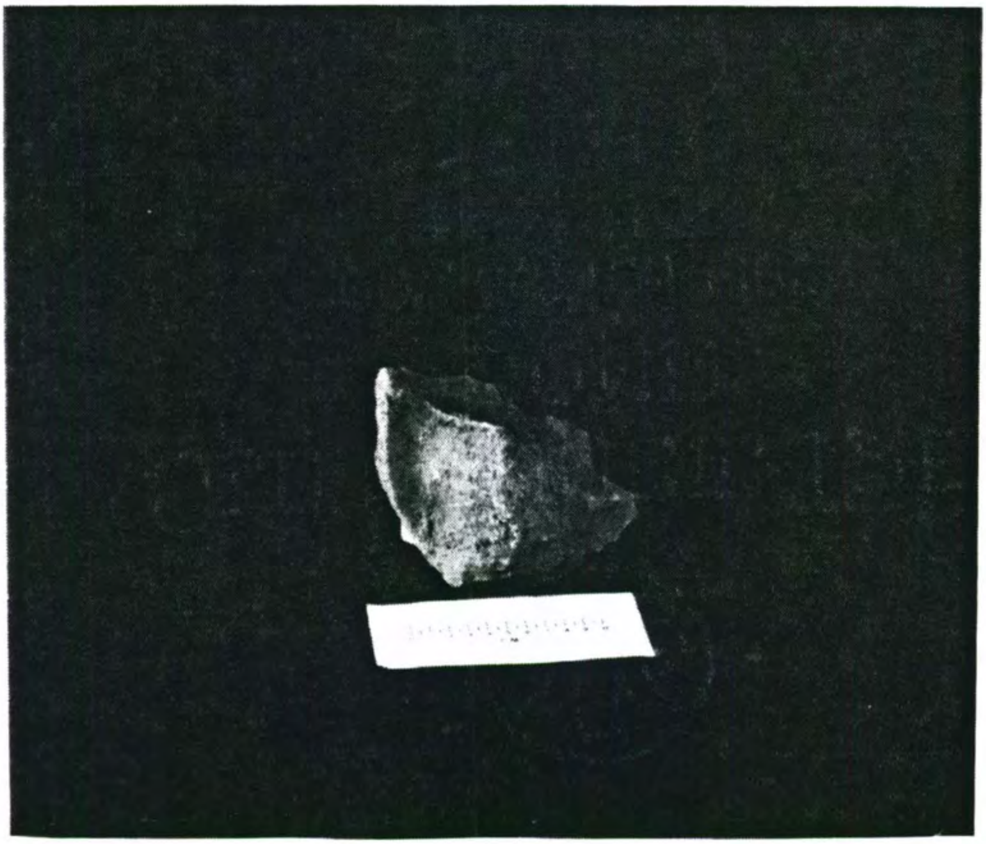


Plate 8 - Daub with Biconcave Impressions

time, this could harden the clay packed on the inside (or outside) of the structure at or near the opening. The daub fragments with biconcave radiating log impressions can be best explained in this manner.

While the above analysis of the daub from the features implies the presence of some sort of semi-subterranean structure the lack of meaningful artifacts from the fill of these structures is immediately noteworthy and disturbing. There are no artifacts recorded from the red clay center of these features. There are a few stone tools, i.e. quartz bifaces from the brown humus under the red clay, but usually just one or two. No potsherds were recovered from the humus from these features. A similar feature at 9Mg218 just downstream from the site (Figure 4) did yield some late Dyar/early Bell phase sherds from a feature of almost identical form. This will be discussed in more detail shortly.

These strange features are certainly the result of human activity and not the products of any natural event. The presence of the stone tools, few though they are, in the humus lining of the pits strongly supports this line of reasoning. Additionally, the center red clay has no evidence of having been slowly washed in. It appears to have been placed or dropped into the center in a very short period of time. Profile development is radically different from anything that could be produced by a tipped tree's root system. Otinger and Lafferty have shown that the profiles from a tree tip would have a quite different profile from the type for the structures at 9Mg28 (1978:6). Furthermore, a total of eleven similar structures were found at the Brinkley site in Northeast Mississippi as reported by Otinger and Lafferty in the above cited report. These contained no ceramics and but a small amount of chipped stone and were, with no other data in hand, assigned to an Archaic time period by them (ibid:4), although there are no radiocarbon dates to confirm this. There is a definite similarity to the features from 9Mg28, however. Comparative profiles are almost identical (ibid: Figure 2). An additional argument against these being natural phenomena is the presence of the impressed daub in a pile at the top of the feature.

Four similar features found at Horseshoe Bend in east Alabama, a late Creek period site, have been interpreted as borrow pits for clay (Dickens 1979:46), ostensibly used to help build a fortification barricade. Examination of the evidence shows at least two reasons why the interpretation of the features as borrow pits is not likely. First, the center red clay is not the product of alluvial refilling as indicated earlier. It is a simple plug of earth quite similar to that which was removed from the hole during its construction. But the presence of the humus layer at the bottom implies the bottom was open for at least a short time. Some very late sherds were even found with the bottom humus at Horseshoe Bend (ibid:40). If these were borrow pits, they were dug, had humic material deposited along with just a little trash, and were refilled with the same material that came from the hole in the first place and had piles of daub, again biconcave angled impressed specimens (ibid:39), added to their tops for good measure! Furthermore, although Dickens concludes that the Creek barricade at Horseshoe Bend was filled with earth (and thus an explanation for the four features provided) not one of the historic documents presented mentions anything about an earth filled wall. Additionally, the barricade ditch cuts through the features and thus post dates them (ibid:37). In light of their similarity to the features from 9Mg28

Dickens' interpretation of these features as borrow pits is rejected in favor of them being small, circular, semi-subterranean structures.

The hypothetical construction details of these structures at 9Mg28 are as follows. First a large basin shaped hole was dug into the earth at the desired location. Considering the soil lost above the level of feature discovery these holes must have averaged a little over three feet deep. The bottoms were flat to rounded and the sides were gently sloped to vertical at the surface. The dirt removed from the hole would have been stockpiled close by the hole, perhaps in a circular pattern. Digging of these holes in the sterile red clay of this hillside would have been difficult. It would have to have been done in a short time or the sun would have baked the exposed clay to an undiggable concrete hardness. Hardened digging sticks and baskets were probably the tools employed.

The superstructure of these buildings were apparently built without resorting to posts driven into the ground. This is quite possible, however, using a method similar to that described by Hitchcock in reference to rotunda roof construction among the Creeks. This involves laying logs horizontally on the ground in a circle just outside the hole. A second layer was then put in place angled over the first layer, and made slightly smaller in circumference. This would continue layer by layer almost until a center peak was reached. Actually it would probably have to be brought up only four or five layers, each layer using shorter logs. Following the formation of this weight bearing and shape forming structural base, numbers of saplings would have been radially placed over the log base and brought to a peak over the very top center of the structure. A crawl space would have been left at some spot along the base as an entrance and exit. Twigs, grass, and straw would probably have next been applied to fill the remaining open spaces in the structure. The final step in construction would have been the placing of the excavated dirt over the structural base thus formed. The dirt would probably have been thickest at the base of the dome and thinned toward the apex, although it would have dirt right up to the smoke hole at the top. The height of the structure above the surrounding ground would not have been above three or four feet in all likelihood. With a floor depth of three feet and a superstructure height of four feet, well over six feet of standing space would have been available.

With the large amount of insulation provided by the earth roof these little structures would require only minimal heat to remain cozy even on the coldest nights. In fact, a traditional fireplace would have been inappropriate because too much heat would have been released. A few live coals brought into the structure from outside, perhaps in a pot, would have been all the heat necessary, particularly if three or four people were in the room at the same time. Anyone having experienced a sweat-lodge will attest to the warming effects that can be created in a small enclosed space by a few bodies and a little heat. While some of these structures may have been used as sweatlodges (by dribbling water on the coals or hot rocks) most were probably used as sleeping quarters on cold nights by the people, perhaps as a family or household unit.

If these structures were merely for sleeping there would be little if any need for the type of items we normally encounter on the traditional house floors. There would be no need for ceramics, except as possible containers for hot coals. No stone tools would be necessary. Mats, blankets, and other sleeping paraphernalia, all totally perishable of course, would be all that was required. The lack of artifacts on the floors of these structures may relate to use in this manner, but it may also be a result of consistent and regular cleaning of these floors. Based upon our general archaeological knowledge of cleanliness standards in private dwellings for Southeastern Indians this is not too likely, however. Cleanliness was not a regular part of the system of values of these people. At certain times of the year, especially just prior to the Busk, or Green Corn Ceremony, in late July or August, the houses and village were cleaned, but during most of the year things got pretty filthy. While it is possible that some of these structures were ceremonially cleaned, it does not seem likely that all of the ones tested would have been so. At site 9Mg218 just south of 9Mg28, a related structure did have a few late Dyar or early Bell Phase sherds on the floor level. The structures found at Horseshoe Bend discussed above have small quantities of debris. Feature 1 at that site produced 17 sherds and five stone fragments plus a few other odd items (Dickens 1979:40). Feature 2 produced no sherds and a total of six quartz fragments while Feature 3 produced no artifacts at all (ibid:40).

The small daub piles in the upper portion of the features at 9Mg28 and Horseshoe Bend apparently resulted from the incidental heating over time of the clay packed around the smoke hole at the top of the structure. The structures at 9Mg28 apparently did not burn down, but rather collapsed after the wooden superstructure rotted in place. The length of time necessary for one of these structures to collapse is unknown, but it might be no more than ten years with logs untreated for termites. Upon collapse the entire superstructure of logs, poles, and grass or matting would have been trapped under the red clay roof covering. As these organic remains rotted in the ground they would eventually turn to a dark humus soil and would, by the nature of the structure and its collapse, be beneath the red clay roof. That is, the form of the collapsed structure would be exactly the same as that described for the features in this class at 9Mg28. No burned or charred logs were in the excavated features at 9Mg28, although some were located in Feature 1 at Horseshoe Bend (Dickens 1979:39). Perhaps this structure was partially burned in its destruction. In point of fact, however, it would be difficult to burn the superstructure of a small earth covered lodge of the type outlined because insufficient oxygen would be available for an all out blaze in a well made structure.

At least one important pattern in the distribution of these features around the Joe Bell site is evident. A series of these features is seen to almost completely encircle the large rotunda or council house in the center of the site. The number of these, and whether it is a complete circle or not, is unsure because it was very difficult to read the dry parched soils on the grid west side of the rotunda. In general, however, these structures are located only 15 feet beyond the wall of the rotunda feature. Beginning on the grid north side of the rotunda, the numbers of the features in this concentric ring of structures are: 10, 9, 38, 15, 17, 28, 21, 51, 54, and 39. The latter three of these are the least distinct. Feature 51 is a large unexcavated red clay area without any visible brown humus. The lack of a visible humus zone is not too surprising considering the structure of these features. The center clay was a much brighter red than the surrounding sterile soil, however, and appeared identical to the red clay in the center of all the other features. The borders were, as would be expected however, difficult to define since we are speaking of a red clay feature imbedded in sterile red clay of a darker, slightly brown color. Feature 54 was discovered after the encircling pattern was apparent. It was found after the rest of the site work had been completed by rescraping in a very dry and inadequately stripped area. A small area of fired clay was discovered at that point. Deposits of fired clay were found nowhere in the village except in the tops of these red clay features and thus it is reasonable that a structure, albeit perhaps a small one, was located at that spot. Feature 39 was also in an area that was poorly scraped initially and all that showed was the linear strip of humus and daub. The associated red clay was indistinguishable from the sterile soil, apparently. Again, considering the pattern and the presence of fired clay, it seems likely that a semi-subterranean structure was present at that point.

Most of the encircling structures were 10 to 15 feet apart, some a little less than this. There are two points in the circle which are represented by larger gaps of about 25 feet between features and are at the oppostie sides of the circle on the magnetic south side between Features 16 and 17 and on the north side between Features 39 and 10.

The likelihood that this arrangement of features could have the same geometric center as the rotunda if the rotunda and these structures were not used and present at the same time is essentially zero. The dating of the rotunda to the Bell Phase is assured by the recovery of Bell Phase potsherds from postholes belonging to that feature. This provides independent confirmation of the date for the encircling semi-subterranean structures. They most certainly dated to the Bell Phase.

No other obvious patterns are present in the distribution of Class IV features over the site, except that larger clusters of them appear east and west of the rotunda (grid northeast and southwest). Whether these clusters of structures were used at the same time as those in the circle is unknown. There is some time depth implied by the placement of a few of these features, however. Feature 8, for instance, which is in the east cluster intruded into the west edge of Feature 43, thus implying that it was somewhat younger, None of these semi-subterranean structures were ever built inside the ring of structures nor inside the confines of the rotunda. This represents probably the largest area on the site where none of these features were located and this implies that either none of these structures were built there because the rotunda was already there or that the area was avoided after the collapse of the latter. The former of these two explanations is the most likely.

It should also be noted that several of the structures were intruded by pits containing artifacts. In fact, almost all artifact bearing features were intrusive into these features. Feature 2 intrudes Feature 48 on the latters grid northwest edge. Feature 5 intrudes Feature 7 on its grid northwest edge. Feature 42 is intruded on its grid north edge by Feature 1. Feature 15 intrudes Feature 16 on the latters grid northwest edge. Feature 12 may be intrusive on the undefined grid north edge of Feature 39 but this is uncertain. The probability that all of these Bell Phase intrusive features would hit only the northern edges of existing features without the people having prior knowledge of the existence of these features is virtually zero. They knew exactly where they wanted to intrude. Since the artifact bearing features are all Bell Phase features, the structures into which they intrude must have dated just prior to that time and must also have been made and used during Bell Phase. Perhaps the garbage was dumped into the doorways of collapsed structures. If this is true then the doors would all be on the river side of the structure. Some of the artifact bearing features such as 1, 5, and 15 are as large or larger than some of the Class IV features. It is quite possible that these represent the filling of abandoned, collapsed, or destroyed earth lodges with trash. See the discussion accompanying the analysis of the Class II features ("trash features") above.

Feature 1 found at 9Mg218, some 1000 feet southeast of 9Mg28 on a ridge overlooking the Oconee, is important in this respect. This feature was revealed in a bulldozer scrape along the hilltop at that point. Its appearance was that of a large trash pit 7.0 feet in diameter. Adjoined to it on the southwest edge was a smaller trash pit 5.6 by 4.3 feet with the long axis in a northwest-southeast direction. A 1.4 foot thick layer of midden and ash pockets, which varied from light to dark, formed the major part of the fill in the largest portion of the feature. Additionally, layers of river clam shells were included along with lots of broken pot sherds and animal bones. Some reconstructable vessels were recovered. All of the material recovered clearly dates to the Late Dyar/Bell Phase. In all these aspects, the feature up to that point was no surprise compared to what was already known about Bell Phase features from 9Mg28 itself. At 1.5 feet deep the midden terminated on what to all appearances was sterile red clay. The midden was all removed and the pit abandoned. Upon reexamination after some two weeks the "sterile" red clay floor was cracked open into large chunky blocks, through the action of the sun. As this does not happen to normal sterile red clay in the area, a large chunk of the red clay was lifted and revealed a thin ashy brown midden layer under some eight inches of this red clay. Subsequent expansion showed what must have been a living floor with very few artifacts on it. There were, however, a small number of Bell Phase sherds in situ on the floor. It appears that Feature 1, with its adjoined smaller unit, was a small semi-subterranean living structure of the type discussed above. As people during the Bell Phase used the structure a few sherds and other debris were lost and accidentally included in the otherwise clean floor level. Eventually the structure was abandoned and collapsed and the red clay roof fill was deposited down over the floor. Apparently a depression was still present in the center of the collapsed structure and this was filled slowly (several different depositional episodes were involved) with garbage and midden probably gathered from others living on the site.

There are two important bits of information derived from 9Mg218, then. First, here was a structure like the ones at 9Mg28 which was nearby and which did have some Bell Phase artifacts on the living floor. This helps confirm the age of those at 9Mg28. Second, it is clear that features of this sort were occasionally used to receive trash after their collapse.

In this regard, a site in northwest Florida and reported by B. Calvin Jones is important (Jones 1973). At the Apalachee occupied Spanish mission site of San Joseph de Ocuya just 15 miles east of

Tallahasse, a large semi-subterranean structure was located and excavated. The similarities of this one structure to those of Class IV features at 9Mg28 are numerous. The outline shape is an irregular circle, although the diameter was larger--just over 19 feet. Profile development is consistent with the pattern at 9Mg218, that is, first a brown humus at the bottom of the three foot deep pit, than a thick layer of red clay, the same as the sterile soil at the site, and finally a deposit of garbage and midden in the top of the feature. Fragments of daub were present with the red clay (ibid:10). A few posts are present around and within the pit, but form no clear pattern in the same manner as those from 9Mg28.

Jones provides a hypothetical drawing of the original form of this structure during use (ibid:16). He shows vertical walls for a short distance (Ca. four feet) and then a low angled roof structure, with a network of radially placed logs meeting in the center, on top of the walls. I believe the overall conical form described above is, however, how this structure was also built. There is no evidence at Ocuya for this sort of vertical wall.

The date assigned by Jones to his circular semi-subterranean structure is sometime shortly after 1633 (ibid:46). This is an almost perfect match with the corrected radiocarbon dates from 9Mg28 (see Appendix B). In fact, the structures at 9Mg28 and the ones at Ocuya could have been in use at the same time.

Other sites have yielded features which are similar in form to those from 9Mg28. At the King site (9F15) in northwest Georgia David Hally has identified two features which may be related (Personal Communication). Feature 47 at this 16th to 17th century site had a virtually identical form to those from the Joe Bell site. This twelve foot diameter feature had an orange clay center and a gray humic sand ring around the exterior. The depth was above four feet in places and profile development was quite similar. Areas of daub and flecked charcoal were present in the upper portion of the feature. Feature 7, a slightly smaller feature with a maximum diameter of nine feet was also an irregular circle. Excavation revealed a depth of 3.5 feet and a quite flat bottom. There was evidence of water layering in some of the center interior at levels well above the floor level. The field notes imply that this may be the remains of a large test pit put in the site by an earlier investigator (Margaret Ashley in 1928) but this is less than certain. If the feature had been a semi-subterranean structure the lensed water laid sand in the center could be accounted for as roof dirt washed in through a partially collapsed roof structure. Upon final collapse the water laid layers would have been covered and preserved. Both of these features at the King site were near each other (30 feet apart) in the southeast corner of the site just inside the palisade wall (Hally 1975:50).

At the Sixtoe village site (9Mu100) at Carter's Dam near Chatsworth in northwest Georgia, a number of features were located in excavation Unit J which are similar in several respects to these features (Kelly, et al. 1965:169-174). These are called "saucers" by Kelly and are the remains of features which vary in diameter from eight feet to about 15 feet or more. The shapes are all irregular shaped circles. Depths vary from one to over three feet for these six features, all of which were clustered near each other. All had trash or midden in them and were interpreted as "quarry pits" which were subsequently filled with garbage. While this may be correct it is possible that these features were initially built as semi-subterranean structures. The report gives insufficient details to really judge in this case, however.

Across the state boundary in Jackson County, Alabama, the most northeastern country in that state, the Bellefonte site (1JA300) is of interest here. Feature 16 at this Mississippian period site shows many similarities in shape to the Class IV features (Futato 1977:17, 23, 33). This elongated basin shaped feature was 6.6 feet (200 cm) long by 4.7 feet (143 cm) wide and 1.2 feet (36 cm) deep below detection. A total of 16 post holes were inside and ringing the pit. Artifacts in the fill were rare, only 36 sherds being recovered. The feature is explicitly described as a "small semi-subterranean Mississippian structure" (ibid:33). Clusters of rock were found near the structure and

> Their proximity to Feature 16 and its small semi-subterranean nature lead to the inference that this was a sweat lodge. However, whether it was used for ceremonial sweating, for a winter sleep house, for both, or for neither is not certain. More typical Mississippian house structures may or may not have been present on unexcavated portions of the site (ibid:247).

It appears that features of the type found at 9Mg28 are not as rare as was once thought. The problem with these structures is their generally amorphous shape, lack of much artifact content (except in the form of later trash put in the holes) and the large structural differences between these and the much better known square to rectangular post structures usually equated with post-A.D. 900 inhabitants of the southeast. Probably many more of these structures have been excavated in the southeast, particularly around Georgia and the surrounding states, and have been either ignored, judged to be too anomalous for comment, or misinterpreted as borrow pits, pothunters pits, or merely trash pits. The situation at 9Mg28, where 34 of these features have been uncovered, makes it impossible to ignore these features any more.

Structures of this type are not completely ignored in the ethnohistorical literature. Perhaps the earliest references are in the accounts of the De Soto expedition from early in the year 1540. After having wintered at the province and town of Apalache (near modern Tallahassee) the entourage entered southwest Georgia on their way into the interior. As they were entering south Georgia two of the chronicles mention a change of housing for the Indians. Of most importance is the account of Biedma who tell us: "There was a change in the habitations, which were now in the earth, like caves: heretofore they were covered with palm-leaves and with grass" (Smith 1968:236). This seems to be a direct reference to semi-subterranean houses. The Gentleman of Elvas tells us, on the same occasion, that: "Throughout the cold country every Indian has a winter house, plastered inside and out, with a very small door, which is closed at dark, and a fire being made within, it remains heated like an oven, so that clothing is not needed during the night time" (ibid:52). Although no reference is made here to the structures being semi-subterranean, separate winter-summer houses are noted as well as the efficient heating characteristics of the winter house.

In 1567, one Francisco Martinez, writing in reference to a battle between Sergeant Moyono and the Chisca Indians, says: "...They drove the Indians into the inner underground huts from which they made sorties to skirmish with the Spanish" (Ketcham 1954:76). He goes on to add that "after killing a great number of them, the latter won the entrances to the huts and set fire to them and burned all the Indians, leaving a total of 1500 killed and burned" (ibid:76). While it is possible that the reference to "underground huts" means mearly above ground wattle and daub style constructions, it is more reasonable to believe that, just as it reads, they were semi-subterranean houses.

Le Moyne, speaking of Indians in Northeast Florida about 1560, relates that: "The Chief's dwelling stands in the middle of the town, and is partly underground in consequence of the sun's heat" (Swanton 1928:352). This tells first that semi-subterranean house were definitely known and used there at that time, and the semi-subterranean structures also were cooler in summer, as well as being warmer in winter. Like natural caves, these artificial ones protected people from weather extremes.

In reference to the insulating properties of round winter houses among the Guale Indians on St. Simons Island, Georgia, San Miguel, writing in the late 16th century, tells us: "...the door of the cabin was so small that it was necessary for us to bend in order to enter; an arrangement due to the cold, although it was spring when we arrived: and so that one may not feel the cold at night and may sweat without clothing it is sufficient to cover the doorway at night with a door made of palmetto, and to light two sticks of firewood within: with this alone we perspired at night and when we were indoors did not feel the cold during the daytime" (Swanton 1946:405). The structure in question here was said by San Miguel to be able to hold 300 men. For "two sticks of firewood" to heat the room as described, the insulating properties of the structure were quite good. This supports the idea that but a few hot coals would have been all that was necessary to heat the small semi-subterranean structures at 9Mg28.

Lawson, writing in the early 18th century, tells us that the houses of the Little Wateree in North Carolina were "dark smoky holes" (ibid: 411). Lawson further tells us in regard to winter houses that "These dwellings are as hot as stoves, where the Indians sleep and sweat all night" (Lawson 1937:187).

Timberlake, writing of his mid 18th century visit to the Cherokee on the Little Tennessee River in Eastern Tennessee tells us that "This hothouse is a little hut joined to the house, in which a fire is continually kept, and the heat so great, that cloaths are not to be borne the coldest day in winter" (Williams 1927:61). This was possibly an earthcovered structure.

A better description of the Cherokee hothouse is provided by Schneider. His account relates that:

> Every family has besides the dwelling house still a smaller hothouse. This has but a very small opening to creep into it, and this is their abode in cold weather; after the fire which is made in the middle is burnt down, the coals are covered with ashes. Their couches of cane fixed round about are their sleeping places, which they scarce ever leave before 9 o'clock in the morning. Then they make again fire for the whole day and night they make another. The old people having but little and the children, til they are 10 years old, no cloathes at all, they could not hold it out in cold weather without such houses. (Swanton 1946:403)

This implies that coals are all that were necessary to maintain heat in such structures although this account says the coals were made from a fire in the lodge as opposed to just bringing live coals into the houses.

Bernard Romans, in discussing the houses of a group of Indians, possibly Choctaw, gives the following account:

> Their habitations at home consist of three buildings, a summer house, a corn house, and a winter house, called a hot house; the two first are oblong squares, the latter is circular, they have no chimnies but let the smoke find its way out through a hole at the top in their dwelling houses, but in the hot houses, where it can; in these they make large wood fires, on the middle of the floor, which being by evening all coals, they enter in, and sleep on benches made round the inside of the building; this would stifle anyone not used to it, and be it never so sharp a morning, they come out sweating and naked as soon as it is day; I believe this proceeding kills numbers of them, as in lattitudes 35 oo, where they live, it is often very cold; they also use for an universal cure of all diseases, excessive sweating in these hot houses, and then with their pores open jump into a hole of cold water, this treatment of those that had the small pox killed numbers; these hot houses of a morning emitting smoke through every crevice, seem to a stranger to be all on fire on the inside. (Romans 1962:67)

This utilization of the winter hot houses as sweat house lodges for medical or medicinal purposes were apparently quite widespread among Southeastern Indians. A little water dribbled on the coals would produce a sauna effect of the first order. The supposed curing powers of sweat baths were well known to other Indian groups throughout north America (Vogel 1979:241-244).

Again speaking of the Cherokee, William Bartram, that ubiquitous observer of the Southeast in the 1770's tells us simply that: "...each house or habitation has besides a little conical house, covered with dirt, which is called the winter or hot-house; this stands a few yards distant from the mansion-house, opposite the front door" (Van Doren

1955:296-297). This is just what the little village structures at 9Mg28 would have looked like from the outside.

Finally, in way of reference to ethnohistoric and ethnographic accounts, there are a number of California Indian groups who made and used earth covered, semi-subterranean structures, both large and small. Photographs from the late 19th and early 20th century are available for many of these buildings and several have been recently published together in the Handbook of North American Indians volume on California (Heizer 1978). Photos of structures with brief descriptions are available for the Southeast Pomo (ibid:307), Konkow (ibid:373); Miwok (ibid:408-409), Luiseno (ibid:555), and Patwin (ibid:357-358). For the Chino an artist's reconstruction shows a village with at least 11 small individual family style semi-subterranean circular earth lodges arranged primarily in a linear form. The structures at 9Mg28 may have looked something like this, all in use at the same time.

In reference to the structures of the Konkow, the following discussion is presented in the text.

> Three dwelling structures were used as the seasons varied during the year. The semi-subterranean earth-covered lodge and the conical bark dwelling were used only for four or five months beginning in November. In the summer, shade shelters were constructed close to hunting and gathering sites off and away from the main village. The summer shade was built on upright poles supporting a flat roof of oak branches and leaves. There were no walls and there was space enough for ceremonial activities.
>
> The semi-subterranean multifamily winter living and assembly house was constructed in spring when the ground was soft. It was of circular ground plan, was excavated to a depth of about four feet, and had a diameter of 20 to 40 feet. The earth removed was used later as a part of the roof cover.

> The dwellings which the Konkow built above the river canyons were, as among the Maidu, of three structural types. The semi-subterranean lodge, excavated in the spring when the earth was soft enough for digging, was constructed in a form somewhat different from its Maidu counterpart. (Riddell in Heizer 1978:376)

A discussion of the structures, all of the above basic form, was also included in the discussion of the Patwin tribe. This description is as follows:

> Structures are the most completely described aspect of material culture. McKern recorded in detail construction methods of the four types of permanent habitation occurring in a village. The dwellings or family house could be placed anywhere, the ceremonial dance house was built at a short distance to the north or south end of the village, the sudatory was positioned to the east or west of the dance house, and the menstrual hut was placed on the edge of the village farthest from the dance house. All these were earth-covered, semi-subterranean structures with an elliptical (River Patwin) or circular (Hill Patwin) form. All except the family dwelling were built with the assistance of everyone in the village. Family houses were built by one's paternal relatives. Materials were gathered beforehand. Digging sticks were used to loosen the earth, which was then carried away in old baskets. Earth for covering the outside was brought from outside the village while that from the pit was banked upon the outside of the rim. With everything and everyone assembled, the project might be completed in a single day. (Johnson in Heizer 1978:357-358)

This last description is interesting in a number of respects. It specifically lists digging sticks and baskets as the tool used to remove the earth. It says that a structure could be built in one day "when everything and everyone was assembled." How long the preparations (cutting logs, arranging people to be there, etc.) took place is not stated however. For some reason (perhaps ceremonial?) the earth from the hole was not used on the roof, but outside dirt brought in. There is nothing to suggest that this occurred in the Southeast or at 9Mg28. It should be noted here that a beautiful lithograph of a California earth-lodge village in the central Valley was presented 100 years ago by none other than Lewis Henry Morgan in his classic monograph entitled "Houses and House-Life of the American Aborigines" (Morgan 1881:107).

It should be pointed out that absolutely no continuity is here posited for the California structures and those in the Southeast. They are merely presented as analogues which have the benefit of accompanying photographs to see actually what these structures must have looked like. In almost none of the pictures is grass growing on the structures. At 9Mg28 I doubt if much grass would have been growing on the structures, perhaps just a few scraggly weeds, and not enough of these to prevent erosion. There are no ethnographic accounts of grasses ever being intentionally planted by Southeastern Indians. The fertility of red clay is not great also. I would suspect that dirt (mud) was often put back on top of these lodges after heavy rains.

The form, then, of these buildings represented by the Class IV features is clear. The use of the structures must have been limited, with that of providing a warm private residence for cold winter nights being the most important. Summer dwellings at 9Mg28 must have been insubstantial at best. The most likely form was that of simple open arbor or lean-to's. The many post molds scattered over the site form no specific square or round patterns (other than the rotunda Feature 55 discussed above), but may represent a diversity of simple structures.

The meanings of features of this type are several. Certainly it means that these people appreciated the heating efficiency of this type of structure. Not as much firewood would have to be cut and hauled. It is possible that this indicated a shortage of easily or closely available firewood, but this seems improbable. In many societies in the world, the presence of private sleeping quarters for families is a reinforcement of the individuality of those families. These small buildings may have functioned socially in a similar manner, but this is, of course, uncertain.

That the floors of these buildings were fairly clean may imply that keeping them clean was a positive value in the little society, although as discussed earlier, it may simply reflect the limited uses for the structures. The circular arrangement of these structures around the council house or rotunda may be seen in at least two lights. First, perhaps these were involved somehow with ritual activities taking place in or centered around the rotunda. This seems less than likely, however, as communication between structures occupied simultaneously would have been difficult to impossible. A more reasonable interpretation of this pattern may simply involve the fact that village life centered on the rotunda and people built their abodes as near it as practical. That all the structures are about the same distance apart and equally distant from the rotunda further supports the belief in the egalitarian nature of the community which once lived at 9Mg28. Not one of all these structures can be picked out as the biggest and fanciest. All are about the same.

Class V

As with Class III, this "class" has only one member--Feature 1. It is somewhat ironic that the first feature found and excavated on the site in 1969 should also be perhaps the most interesting of the entire site. Feature one has many similarities to the Class II features discussed above as "trash" features, although there are enough distinctive characteristics about it to justify setting up a separate form category just for it.

The similarities between Feature 1 and the Class II features include size (diameter), pit shape (almost identical), and location (intrusive into a Class IV feature on the latter's northern edge). The differences between this feature and the rest of the "trash" features involves reference to the actual contents of the pit and their manner of deposition (Plate 9).

First, and of critical importance, is the fact that the entire contents of Feature one appear to have been deposited in a single episode. There is no evidence of stratigraphic buildup in the feature, rather, the contents were simply piled into the pit in quick order. Further, the presence of large charred log fragments and evidence of color changes in pottery sherds included in the fill both indicate that the entire pit, with its newly deposited contents, was burned in one large fire. Following the natural resolution of this bonfire the feature was not disturbed again. Feature 2 also had no evidence of stratigraphic build up through time, but it was a very shallow feature and differed in other respects from Feature 1.

The second and perhaps most important difference between Feature 1 and the Class II features involved the pit contents themselves. Feature 1 is readily distinguishable because of the huge quantities of large potsherds present in the fill. In fact, there was probably more pottery than dirt in the fill of this pit. A total of 2941 sherds were located

Plate 9 - Feature 1

in Feature 1 as opposed to a mean of only 799 in the Class II features, 3.7 times as many. When compared by weight, the differences are even more striking. While Class II features contained an average total sherd weight of 31.1 pounds Feature 1 contained 5.1 times that with a total of 188.91 pounds of pot sherds. The sherds from Feature 1 were also larger than those from other features. For Class II features the mean sherd weight was .038 pounds (17.2 grams) while for Feature 1 the average sherd weight was .064 pounds (29.0 grams). Another measure of the differences between Feature 1 and the Class II sherd contents is the density of sherds in the fill of the pits. For Class II the mean number of sherds per cubic foot of pit fill was 34 while for Feature 1 the same variable was 58.8. This does not follow a pattern present within Class II features that may be stated as the larger the volume of a (Class II) feature, the lower will be the sherds per cubic foot for that feature. Whether this pattern is present on any other sites is unknown, but worthy of investigation in the future.

Following the removal of the huge quantity of large potsherds from Feature 1, it was immediately apparent that a large number of reconstructable vessels were present. Reconstruction of these vessels was accomplished though the efforts of Marshall Williams and the author over a one year period of evening work. Following completion of this reconstruction project it was found that 85.6% of the sherds (by weight) from Feature 1 had been assigned to vessel fragments. A total of 62 vessel numbers were assigned. Incidentally, only 55.5% of the sherds by count had been assigned to their proper vessel. This discrepancy is easily accounted for by the observation that most of the unassigned sherds were small (less than the size of a half dollar) plain sherds which could have belonged to any one of the vessels.

The average number of reconstructable pottery vessels from the Class II features was 17. Thus the 62 from Feature 1 is 3.6 times as many. Further, the reconstructed vessel fragments from Feature 1 were more complete after the reconstructions were performed. For Class II the average vessel fragments after reconstruction was just over 24% present while those from Feature 1 had an average vessel percentage present of 38.8%. This latter figure would actually be greater had not a few single unique rim sherds from Feature 1 been assigned vessel numbers as they were. This was done to increase the vessel count for vessel analysis purposes. The vessel fragments from Feature 1 appeared to be the same sort of general utility vessels as those from the trash features. All in all, however, it is clear that Feature 1 contained far greater numbers of larger broken vessel fragments than any Class II feature and thus is distinctly different in that aspect.

One other facet of the ceramic collection from Feature 1 was remarkably different from those of Class II features. Vessel 4 from Feature 1 was a small, thick walled, intact vessel. This is the only vessel from 9Mg28 that was unbroken. This in itself is not surprising, but considering its context it is. Intact vessels are but rarely found in "trash" pits - people don't usually throw away items that are still useful - thus the standard "trash" designation for Feature 1 seems less likely. Additionally, of 17 vessels from the site that, upon completion of their reconstruction, were 85% of more present, 88.2% (15 out of 17) were from Feature 1. Indeed, from Feature 1, it appears quite likely that a certain number of these vessels were intact until they entered, probably through simply dropping or throwing them into the pit, perhaps after the fire in the pit was already ablaze. Vessel 4, the smallest and most compact of the 62 numbered vessels from Feature 1, is the one least likely to be broken by simply dropping or tossing it into the pit. Several of the other nearly complete vessels were broken and slightly scattered in a manner suggestive of intact vessels being tossed in and breaking upon contact with the contents of the pit up to that point. Several vessels were possibly broken before deposition as sherds that fit often have been refired to different colors, although this may have occurred in the burning of the pit.

Only 162 animal bone fragments were found in the fill of Feature 1. Although this number may be low due to but partial water screening (through window screen) of the pit fill, certainly we can say that relatively little bone was present. The average number of bones per cubic foot for this feature was only 3.2. This compares to 25.2 bones per cubic foot in the Class II trash features. Floral remains were likewise rare. The details of the faunal and floral data for Feature 1 are discussed in Chapter 12, although it may be here stated that not much was added to our knowledge of Bell Phase subsistence from the remains of Feature 1 that was not more completely documented from Class II features.

With the form of Feature 1 in mind, and its distinctiveness from the Class II features noted, the question of immediate concern is: What were the use, meaning, and function of Feature 1 to the people living at 9Mg28? Examination of the ethnohistoric literature for the Southeast does provide a possible answer in connection with the annual harvest festival and the rituals associated with this the so called Green Corn Ceremony.

The Green Corn Ceremony, or Busk as it is also known, and its meaning to the historic Indians of the Southeast U.S. has been reported and discussed by many authors (Williams 1973, Van Doren 1955; Swanton 1946, Howard 1968; Hudson 1976). The aspect of the ceremony under investigation here generally occurs on the first day of this annual mid-summer renewal ceremony and involves the physical cleaning of the town. Essentially, all the old food scraps and containers were collected and disposed of in the proper manner as part of the fast and then feast cycle of the ceremony. Bartram tells us:

> When a town celebrated the busk, having previously provided themselves with new cloaths, new pots, pans, and other household utensils and furniture, they collected all their worn-out cloaths and other despicable things, sweep and cleanse their houses, squares, and the whole town, of their filth, which with all the remaining grain and other old provisions, they cast together into one common heap and consume it with fire. (Van Doren 1955:399)

The version of Louis LeClerc Milfort is similar.

> Each year, in the month of August, they [Creeks] assemble by settlements to celebrate the harvest festival; then they replace everything they have used in the course of the year which had just expired; the women break and shatter everything which makes up their household goods and furnish their homes anew. (Milfort 1972:98)

James Adair presents a slightly different description, involving the cleaning of the "temple" as he calls it.

> In the mean time, several of them are busy in sweeping the temple, clearing it of every supposed polluting thing, and carrying out the ashes from the hearth which perhaps had not been cleaned six times since the last year's general offering ... and before sunset, the temple must be cleared, even of every kind of

> vessel or utensil, that had contained, or been used about any food in that expiring year. The women carry all off ... (Williams 1973:106-7).

McGillivray's account (quoted in Schoolcraft 1855) tell us:

> Some of the new fire is next carried and left on the outside of the square for public use; and the women allowed to come and take it to their several houses, which have the day before been cleaned, and decorated with green boughs for its reception; all the old fire in the town having been previously extinguished, and the ashes swept clear away, to make room for the new.

Benjamin Hawkins (1848) provides us with the following brief statement. "In the morning the warriors clean the yard of the square..."

All of the authors agree that the cleaning took place on the first day of the festivities. Three of the references mention the destruction of ceramic vessels. Bartram also tells us that any small amount of food remaining in the houses were also discarded. Adair informs us that it is the women who "carry off" all the old items. There is a divergence of description about just what areas are cleaned. Milfort and McGillivray discuss cleaning of the individual households while Adair emphasizes the temple and Hawkins speaks of cleaning the square ground itself. Bartram's description involves cleaning "houses, squares and the whole town." It should be pointed out here that the descriptions provided by Bartram--the most detailed--are probably our most reliable also since he was a naturalist and therefore a trained observer. He is the only one who mentions the use of fire to destroy all the collected vessels and debris. That fire was used for this purpose is quite believable in light of the Southeastern Indians belief system. Hudson tells us that "Fire was itself the ultimate symbol of man's struggle against pollution" (1976:318).

Given these sources, the question is put: What would be the most probable form for an archaeologically recoverable feature resulting from the ceremonial cleaning of the houses and temple of a Southeastern village during the initial phase of the green corn ceremony described above?

The feature should be a fairly large one, to accommodate all of the material from the entire village, assuming it was all put together in "one common heap" as Bartram tells us. It should contain a large number of ceramic vessels, probably broken before or during the deposition, but some intact. The feature should have evidence of burning, probably in the form of charred logs used to fuel a large fire. There should be some evidence of food debris present, but probably not in very large quantities. There should be no evidence of accumulation of the deposition over time, the construction, burning and abandonment having taken place probably on the same day. Quantities of discarded fire ash may be present, but may be difficult to distinguish from that of the feature fire itself.

A feature exhibiting the above characteristics may seem difficult at first to separate from a normal day-to-day trash pit. The prime characteristics differentiating the two involve the large number of vessels or fragments present, the possible inclusion of unbroken vessels, which usually do not occur in a normal trash pit, the lack of evidence of build up over time, and strong evidence of fire such as differential refiring from the same pot.

As the reader is surely aware by now, the above description is virtually identical to the form of Feature 1 at 9Mg28 and it can only concluded that, in all likelihood, that feature indeed does represent the remains of a Busk Ceremonial clean up.

To the author's knowledge no feature recovered from an archaeological site in the southeast has, prior to Feature 1 at 9Mg28, been of this exact form, and by implication the same use, function, and meaning. The Irene site had a "pottery dump" near the rotunda, devoid of midden other than large sherds. The area was 16 feet square and six inches deep and consisted of several vessel fragments as large as 1/4 to 1/3 of a whole vessel. The feature is interpreted as follows.

> The position of the deposit and the lack of midden material suggest an explanation in terms of ceremony. Cassine drinking is reported to have been one of the chief activities carried on in the rotunda of the Creeks, and since this drink was sacred it is possible that the vessels used were sacred as well. Very likely such vessels which were broken either intentionally or accidentally would have been discarded in a separate place where they would not have been defiled, and this might account for the absence of midden debris. (Caldwell and McCann, 1941:31)

In continuing with the analysis of this feature in the manner done for the other feature classes, the use, meaning, and function must be examined. The use of the feature was to dispose of old pots and food debris from the previous year. And it should be noted that this annual event would preclude any pots in the village from being over one year old. Whether this was strictly adhered to or not is unknown. The meaning of the feature centers around the idea of renewal associated with the successful harvest of the crops, especially corn. In addition to the household goods disposed of in the feature under discussion here, it was a standard procedure to put out all the fires in the village and renew them from freshly started sacred fire (Hudson 1976:

371). Apparently the old pottery vessels and food scraps were considered polluting and were destroyed and perhaps cleansed in their destruction with fire.

The feature, and the ritual involved in its production must have had several functions. On the technological level it meant that new vessels were necessary to replace the old and must be made, probably beforehand. It is noteworthy that pottery, which was almost exclusively made by women in Southeastern societies was, according to the above documents, disposed of by women also. This event would function socially to unite the women of the village in a common, if brief, symbolic act. In this light, it seems probable that all the women (and perhaps female children) would have valued their individual involvement in the ritual. There were at least three possible roles to be played in the destruction of the old polluted household vessels and utensils. These included, first, the preparations for the fire in the form of gathering and placing the fire wood and kindling, second, the actual lighting of the fire, and third, the actual deposition of the remains themselves, family by family. Whether this last role was performed before or during the fire is not certain, but there were pot fragments both under and on top of the charred logs in Feature 1. Many of the vessel fragments from Feature 1 were almost intact as discussed above, but a far greater number consisted only of quarters, thirds, and half pots. While a small portion of the top of the feature must have been lost to the plow, it is certain that the greatest portion of the vessels thrown into this pit were but partial vessels. Hally has shown that partial vessels of this sort were occasionally used as platters, dippers, or cooking surfaces (1980b). It is possible that some of the vessel fragments from Feature 1 were used in this manner prior to their disposal, but this is uncertain here.

In light of the above discussion, an alternate explanation for there having been so many partial vessels in Feature 1 is that women may have saved large bowl fragments, broken perhaps some time before the Busk, in order to be able to have something to toss in the ritual fire. This is the most obvious way all women could participate in the ceremony. In any event, the rituals associated with Feature 1, whatever there specific nature, were but a small part of the village wide renewal and cleansing associated with the widespread Busk Ceremonial, a central part of their belief system.

Class VI

This group consists of but three features, numbers 12, 18, and 19. Features 18 and 19 are located near each other west of the Rotunda, while Feature 12 is north of the rotunda and slightly closer to it. All are small to medium sized circular, shallow features with light grey ash being the major fill type. The mean diameters for these features are 4.2 by 4.0 feet (standard deviations are 1.67 and 1.4 feet respectively). The coefficients of Variation for the group diameters are thus .4 and .35.

The mean depth for these features was .74 feet with a low standard deviation of .24 feet and a V of .33. The volume mean for the three little pits was 9.7 cubic feet. Standard deviation for this was 2.5 cubic feet and thus the V was a low .26. The shapes of Features 18 and 19, located only four feet away from each other in the southwest part of the site, were cylindrical with flat bottoms (slightly irregular) and straight vertical walls. Feature 12, the largest in diameter of the three, was a simple shallow basin shape. Based upon pit shape alone, Feature 12 is more similar to Feature 2, but the fill and artifactual data from Feature 12 align it more closely with Features 18 and 19.

The fills of Features 18 and 19 are also most similar. In addition to the predominant light grey ash, both contained bits of charcoal and small amounts of fired red clay. Feature 12 had the grey ash with small bits of charcoal, but lacked the fired red clay bits. The first two features were apparently mixed and resulted from several separate depositional episodes. Feature 12 may have been the result of more than one deposition, but this is unclear. In all three, however, the grey ash, in all probability the burnt remains of wood fires, formed the major fill material. The lack of any charred material other than very small bits, coupled with the mixed and partially stratified nature (at least of Feature 18) raises the possibility that these features represent not the location of the burning of the wood that produced the ashes, but, rather, a dump where ashes and debris from another place were gathered and dumped.

There were relatively few sherds in these features. The mean for all three was 79 with a large standard deviation and coefficient of variation of 39.9 and .51 respectively. The mean weight of these same sherds by feature was 3.40 pounds, again with fairly large standard deviation and V of 1.67 and .49. Thus the mean sherd weight for this group was .043 pounds (19.5 grams) with a standard deviation of .004 pounds (1.9 grams) and a very low V of .09. This means that the mean sherd weight was just larger than the average sherd from Class II features but still much smaller than those sherds from Class V. The number of sherds per cubic foot of fill for this class was 9.1 with a large standard deviation of 5.6 and coefficient of Variation of .62. This represents only 27% of the sherd density found in the Class II "trash" pits.

All three features in the group had but one reconstructable pottery vessel fragment. This is significantly less than the mean of 17 for Class II. Further, in all cases, the single vessel fragment was lying flat on the bottom of the feature under the ash fill. For the single reconstructable vessel in each of these pits, the mean percentage of vessel present was 33. The standard deviation was large--23.6 and the resulting coefficient of variation was also large--.71. Feature 19's single vessel fragment was 60% complete while Feature 12's was 25% and Feature 18's was but 15% complete.

The mean number of bones for these three features was 165 with a standard deviation of 122 and a V of .74. The wide variation was caused by Feature 12 which had over three times as many bones as either Features 18 or 19. The mean number of bones per cubic foot of fill was 17.4 with another large standard deviation of 11.9 and a coefficient of variation of .68. Class II features were even more highly variable in their bone content, however.

By way of form summary and to emphasize the differences between this class and Class II the main differences are as follows. This group is more variable in diameter than Class II, but, at the same time, is less variable in depth and volume that that group. These pits all had a grey ash fill rather than the mixed black midden in all Class II features. The actual diameters, depths, and volumes of these features are considerably less than those in Class II. Volume for instance was only 23% of that in the "trash" pit class. Each of the group six features had only 10% of the sherds that a Class II pit had and only one vessel fragment was present in the former. The sherd density was much lower even realizing that the features were much smaller. The average sherd size was slightly larger than those in Class II, but still much lower than Class V. Incidentally, the correlation coefficient (Pearson's R) for the correlation between sherd counts and sherd weight for these features was .97 (Blalock 1972). With 1.0 being a perfect positive correlation, this implies that weight of sherds is just as useful as a measure of sherd quantity as is counts. For Class II features it was an even higher .987.

Ash, of course, comes from the complete burning of wood. Green or fresh wood is more difficult to burn completely to ash because of the high moisture content. Ash on an archaeological site comes from wood burned for any of several reasons. During the winter time, the prime reason for burning wood is that of providing warmth to the people. Human beings are tropical creatures by nature and require the use of fire as an adaptive mechanism to colder winter climates such as is present at 9Mg28. The second major need for wood fires would have been for the cooking of food. The heating of animals and plants in the process known as cooking initiates the breaking down of the substances and aids their digestion by humans. Both of these activities involve fire as the desired element with ash simply being the unused residue.

Examination of the ethnohistorical literature for the Southeast United States has uncovered no specific references that describe the construction and use of a feature just like those in Class VI. There was, however, at least one use for wood ash, apart from its by product role in fire, which should be noted here. In writing of the production of hominy, a standard corn based food product in the Southeast, Charles Hudson states:

> Wood-ash lye was also needed in making hominy. The Indians made it by placing hardwood ashes in a container with a small hole in the bottom. They filled the container with the ashes and poured in a quantity of cold water. The yellow liquid which dripped out of the hole was lye. (Hudson 1976:304)

He goes on to add that:

> This technique of processing corn with wood-ash lye has been found to reduce some of its essential amino acids, but it dramatically increases the amount of the amino acid lysine and also the amount of niacin. Thus this treatment of corn enhances its nutritional value selectively. For people whose diet depended heavily on corn, this technique probably reduced the incidence of pellagra. (ibid)

Of importance in understanding this group of features are the artifacts found with the ash. One of the most critical are the animal bones, and, though not mentioned above, the small quantities of plant remains. Further, these features are apparently not inside of any sort of village structure. This latter point, as well as the presence on the site of the small semi-subterranean structures, whose major useful asset was their heat retaining and thus warming capabilities, means that the purpose of the Class IV features was not primarily for heating, at least at the location of the feature. The almost complete lack of wood in forms other than pure ash is not what one normally expected from a cooking fire where some larger amounts of charcoal would be expected. The presence of the animal and plant remains, apparently distributed throughout the ash pit fill may or may not support the idea of these being cooking fires. I doubt if that much material (over 300 bones in Feature 12 for instance) would be accidentally lost in a cooking fire but it might be possible. If the ashes here had been intentionally made and used for lye production for use in making hominy, however, I see no reason for the plant and animal remains and the pot sherds to be included and thus reject this idea.

In discussing the Class IV features--the earth covered, semi-subterranean houses--it was pointed out that no fire pits were located within them and that, further, it would require but a few hot coals to heat the structures. If, as was suggested, the required coals were started outside and brought in, perhaps in a pot or on a large potsherd, the ashes from one evenings warmth could be thrown out the next day. I believe one possible explanation for the Class IV features is that they represent the accumulated ash from several huts for several nights. At 9Mg218, the small site just south of 9Mg28 which was discussed earlier as another site with a collapsed earthlodge of the same form, the thin floor stratum consisted of primarily light grey ash of the same color and consistency as that in the fill of the Class VI features. Further, the large potsherd fragments from these features might have been used to transport the hot or cold ashes. The animal remains may have been incidental fill in a primarily ash dumping area.

There are certainly problems with this admittedly weak argument and I do not have the faith in this explanation I have for the previous features classes. One question is: Why would a hole, even a small one, be dug to dispose of the ashes? An alternate explanation may be that the remains in these features may represent remains from fires used in the rotunda and had to be disposed of in a more formal manner than normal ashes. The small holes of Features 18 and 19 are just the same size and shape as the burials of Class I. Perhaps they were dug for this purpose and not used, later being filled with ashes. Fine screening of the fill revealed no scraps of human bones as would have been evident if these were cremation pits or decayed burials. They may also have been summer cooking fires, but this is unproven also.

In any event, features of this type are specific enough in their form details to be classed together and perhaps in the future will be found at more sites where their use will be more clear and an attempt can then be made to estimate their meaning and social function in the lives of the people.

### Class VII

The only justification for this class is as miscellaneous features for which no suggested use, meaning, or function will be given. Indeed, they are discussed here only for completeness. In fact, there is no direct evidence that they are even of Indian origin, although most of them probably are.

Feature 29 was a small scatter of Early Archaic material, all of which was found without any recognizable soil discoloration. This material has obviously no relation to the major portion of the site. Lisa O'Steen is analyzing the recovered stone tools as part of her research on the Early Archaic of the Lake Oconee area (Personal Communication).

Feature 52, a small ashy area, probably of Bell Phase occupation, remained unexcavated. It may be related to Class VI features although its irregular shape is quite different from the circular features in that group.

Feature 14, found off the site proper in the area near Feature 13 in the south part of the site, was shaped like a modern human burial, but had neither bone nor artifacts in its light brown humus fill. No idea of its date or function are forthcoming, although it probably was of human origin as opposed to natural origins.

Feature 11 was a small area (3.1 by 2.9 feet) of fired clay and black humus. Feature 4 was a dark brown feature of similar small size (3.2 by 1.8 feet). The two of these together are most similar to a Class IV feature, but the small size and apparent separation of the two makes this uncertain. The most obvious characteristic of fired clay which was similar to that in other Class IV features means that at least Feature 11 may well date to the Bell Phase.

Three other small features were of simple dark brown humic stains of varying sizes. Feature 3 (3.4 by 4.3 feet) and Feature 53 (3 x 2 feet) were both tested with no results. No artifacts or other evidences of human occupation were present, and it can not be concluded that these were of Indian origin. Feature 37 was also a dark brown humic stain but was larger than the other two, being 9 by 4 feet in dimensions. As mentioned in the initial description of this, the last feature to be here discussed, this may have been a dark area destroyed by the tires of the earth mover. No more data are available and it also cannot be shown to have been of Indian origin.

# CHAPTER 6

# ARTIFACTS

This chapter is to be more descriptive than analytical. That is, it is more concerned with form than with use, meaning, and function. There are but two major categories of artifacts from 9Mg28--ceramic and lithic. All of the animal and plant remains are reported and analyzed in the Chapter 12.

## Ceramics

The ceramic material from 9Mg28 must be studied with the realization that two separate ceramic components were present at the site. The situation is further complicated by the fact that these two components, the Bell and the Duvall Phase of Lamar culture were not known to be 100+ years apart when work was first begun on the site in 1969. Additionally, the classification performed on the ceramics from the 1969 excavations on the site was quite simple, and time has not permitted a reanalysis of that material to coincide with the more detailed analysis done on the more recently excavated materials from 1977. Table 1 shows the basic pottery counts for the site as a whole, and the inconsistent nature of the typology reflected in the chart shows this problem. Note that this table is listed by provenience, not features. A list of the locations of all proveniences is provided in Appendix A.

Table 1

9Mg28
Pottery Summary

| | Area 1 1969 | Area 1 1977 | F-13 1977 | Sub Totals | Area 2 1969 | F-1 1969* | F-2 1969* | Main Site 1977 | Sub Totals | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| Plain | 1892 | | | 1892 | 4098 | | | | 4098 | 5990 |
| Smoothed | | | | | | | | | | |
| fine grit | | 724 | 184 | 908 | | | | 1009 | 1009 | 1917 |
| coarse grit | | 1932 | 290 | 2222 | | | | 1901 | 1901 | 4123 |
| Burnished | | | | | | | | | | |
| fine grit | | | 49 | 49 | | | | 143 | 143 | 192 |
| coarse grit | | 1 | 1 | 2 | | | | 20 | 20 | 22 |
| Incised | 203 | | | 203 | 541 | | | | 541 | 744 |
| Fine | | 6 | 4 | 10 | | | | 58 | 58 | 68 |
| Medium | | 59 | 17 | 76 | | | | 184 | 184 | 260 |
| Bold | | 10 | 11 | 21 | | | | 23 | 23 | 44 |
| Cross hatched | | 14 | | 14 | | | | 18 | 18 | 32 |
| Unidentified | | 39 | 16 | 55 | | | | 41 | 41 | 96 |
| Stamped | 86 | | | 86 | 44 | | | | 44 | 130 |
| Simple | | | | | | | | 11 | 11 | 11 |
| Lamar | | 39 | 2 | 41 | | | | 4 | 4 | 45 |
| Unidentified | | 15 | | 15 | | | | 33 | 33 | 48 |
| Other Decorated | | | | | | | | | | |
| Weathered | | | 2 | 2 | | | | 13 | 13 | 15 |
| Pinched | | | | | | | | 5 | 5 | 5 |
| Unidentified | | 19 | | 19 | | | | 51 | 51 | 70 |
| Miscellaneous | | | | | | | | | | |
| Pipe | 1 | 3 | 5 | 9 | 38 | | | 20 | 58 | 67 |
| Disc | 4 | 3 | | 7 | 4 | | | 4 | 8 | 15 |
| Node | | | | | | | | 1 | 1 | 1 |
| Loop Handle | 1 | 1 | | 2 | | | | | | 2 |
| Fiber Tempered | | 1 | | 1 | | | | | | 1 |
| Other (?) | | 9 | | 9 | | | | 7 | 7 | 16 |
| Rims | 194 | | | 194 | 480 | | | | 480 | 674 |
| TOTALS | 2381 | 2875 | 581 | 5837 | 5205 | 2941 | 746 | 3546 | 12438 | 18275 |

* Pottery vessels reconstructed before pottery was typed.

Sherds from 1969 work were typed more simply than were those from 1977.

Fortunately, the component designations break down fairly cleanly by areas of the site. Area 1 and Feature 13 are from the Duvall Phase component of the site (see description at beginning of Chapter 4) while Area 2 and all of the main excavated part of the site date to the Bell Phase. This separation is reflected on the above table. Of the total of 18275 sherds found in all the excavations at 9Mg28, 5827 or 31.9% were from the Duvall Phase component. Thus 12,438 or 68.1% were from the Bell Phase component. Although there is undoubtedly some overlap it is not great. A small amount of Duvall material comes from Area 2 but almost no Bell Phase material was found in Area 1 (see Figure 4).

For the Duvall Phase component a total of 5073 plain sherds were recovered. These represented 86.9% of the collection from that component. Incised sherds accounted for 379 sherds or 6.5% of the total while paddle stamped sherds accounted for 142 sherds or 2.4% of the total. All three of these categories might be up to 1% greater because for the 1969 work in this area 194 "rim" sherds were recorded without noting the body type. The high proportion of plain is not surprising, as Smith (1981) has discovered for the Duvall Phase at the Dyar Mound site (9Ge5). For the 1977 excavations in Area 1 a further division was made in the analysis of the plain, incised, and stamped categories. Table 2 lists all of the 1977 sherd data. Again see Appendix A for specific locations of the proveniences.

In the plain category a total of 3181 sherds were identified. This represents 92.0% of the 3456 Duvall Phase sherds recovered in 1977. This plain category was divided into sherds that were simply smoothed on their exterior and those that were burnished to a low luster. Further, each of these categories were divided into those sherds that

Table 2

9Mg28
Ceramics (1977)

| | Prov. 1 | Prov. 2 | Prov. 3 | Prov. 4 | Prov. 6 | Prov. 8 | Prov. 9 | Prov. 10 | Prov. 11 | Prov. 12 | Prov. 14 | Prov. 16 | Prov. 17 | Prov. 18 | Prov. 20 | Prov. 21 | Prov. 22 | Prov. 23 | Prov. 24 | Prov. 25 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plain | | | | | | | | | | | | | | | | | | | | |
| Smoothed | | | | | | | | | | | | | | | | | | | | |
| fine grit | 303 | 2 | 2 | 3 | 2 | 1* | 1* | | 6 | 68 | 373 | | 140 | 43 | 12 | 18 | 5 | | 6 | 1 |
| coarse grit | 643 | 1 | 3 | | | | | 4* | | 30 | 91 | 503 | 80 | 35 | 16 | 21 | 147 | 34 | 1 | 95 |
| Burnished | | | | | | | | | | | | | | | | | | | | |
| fine grit | 90 | | | | | | | | | 34 | | | 17 | | | | 1 | | 1 | |
| coarse grit | 13 | | | | | | | | | 6 | | | | | | | | | | |
| Incised | | | | | | | | | | | | | | | | | | | | |
| Fine | 32 | | 1 | 1 | | | | | | 1 | 9 | 1 | 6 | 2 | 1 | 1 | 1 | | 2 | |
| Medium | 98 | | | 1 | | 1* | | | | 8 | 15 | 3 | 34 | 15 | | 3 | 5 | | | |
| Bold | 7 | | | | | | | | 1 | 1 | 7 | | 3 | | | 1 | 1 | | | |
| Unidentified | 22 | | | | 2 | | | | | 5 | 6 | | 6 | | | | | | | |
| Cross hatched | 4 | | | | | | | | | | 14 | | | | | | | | | |
| Stamped | | | | | | | | | | | | | | | | | | | | |
| Simple | 1 | | | | | | | | | | 8 | 1 | | | | | | | | 1 |
| Lamar | | 1 | | | | | | | | | 2 | 1 | | | | 1 | | | | |
| Unidentified | | | | | | | | | | | 28 | 3 | 1 | | | | | | | |
| Other Decorated | | | | | | | | | | | | | | | | | | | | |
| Weathered | | 1 | | | | | | | | | 11 | | | 1 | | | | | | |
| Uniden. Pinched | 4 | | | | | | | | | | | | | | | | | | | |
| Unidentified | 14 | | | | | | | | | | 29 | | 5 | | | | | | 1 | 1 |
| Miscellaneous | | | | | | | | | | | | | | | | | | | | |
| Pipe | 13 | | | | 1 | | | | | | 1 | 3 | 1 | | | | 1 | | | |
| Disc | 1 | | | | | | | | | | 2 | | 1 | | | | | | | |
| Loop Handle | | | | | | | | | | | | | | | | | | | | |
| Node | 1 | | | | | | | | | | | | | | | | | | | |
| Historic | | | 1 | | | | | | | | 12 | | | | | | | | | |
| Other | 5 | | | | | | | | | | | | | 1 | | | 2 | | | |
| TOTALS | 1251 | 5 | 7 | 5 | 5 | 2 | 1 | 4 | 7 | 153 | 608 | 515 | 294 | 97 | 29 | 45 | 163 | 34 | 11 | 98 |

* These sherds are from post holes beside features 8, 9 and 10.

| | Prov. 26 | Prov. 27 | Prov. 28 | Prov. 31 | Prov. 32 | Prov. 33 | Prov. 34 | Prov. 35 | Prov. 39 | Sub Totals | 13 | 15 | Sub Totals | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Plain** | | | | | | | | | | | | | | |
| Smoothed | | | | | | | | | | | | | | |
| fine grit | 13 | 9 | | | | 1 | | | | 1009 | 184 | 724 | 908 | 1917 |
| coarse grit | 4 | 2 | 1 | 5 | | | 2 | 3 | 180 | 1901 | 290 | 1932 | 2222 | 4123 |
| Burnished | | | | | | | | | | | | | | |
| fine grit | | | | | | | | | | 143 | 49 | | 49 | 192 |
| coarse grit | | | | 1 | | | | | | 20 | 1 | 1 | 2 | 22 |
| **Incised** | | | | | | | | | | | | | | |
| Fine | | | | | | | | | | 58 | 4 | 6 | 10 | 68 |
| Medium | 1 | | | | | | | | | 184 | 17 | 59 | 76 | 260 |
| Bold | 1 | 1 | | | | | | | | 23 | 11 | 10 | 21 | 44 |
| Unidentified | | | | | | | | | | 41 | 16 | 39 | 55 | 96 |
| Cross hatched | | | | | | | | | | 18 | | 14 | 14 | 32 |
| **Stamped** | | | | | | | | | | | | | | |
| Simple | | | | | | | | | | 11 | | | | 11 |
| Lamar | | | | | | | | | | 5 | 2 | 39 | 41 | 46 |
| Unidentified | 1 | | | | | | | | | 33 | | 15 | 15 | 48 |
| **Other Decorated** | | | | | | | | | | | | | | |
| Weathered | | | | | | | | | | 13 | 2 | | 2 | 15 |
| Uniden. Pinched | 1 | | | | | | | | | 5 | | | | 5 |
| Unidentified | | 1 | | | | | | | | 51 | | 19 | 19 | 70 |
| **Miscellaneous** | | | | | | | | | | | | | | |
| Pipe | | | | | | | | | | 20 | 5 | 3 | 8 | 28 |
| Disc | | | | | | | | | | 4 | | 3 | 3 | 7 |
| Loop Handle | | | | | | | | | | | | 1 | 1 | 1 |
| Node | | | | | | | | | | 1 | | | | 1 |
| Historic | | | | | 1 | | | | | 14 | | | | 14 |
| Other | | | | | | | | | | 8 | | 9 | 9 | 17 |
| TOTALS | 21 | 13 | 1 | 6 | 1 | 1 | 2 | 3 | 180 | 3562 | 581 | 2874 | 3455 | 7017 |

had, as subjectively judged by the lab technicians, coarse or fine grit mixed with the clay of the sherds as a tempering agent. A total of 98.4% of the plain sherds were simply smoothed, leaving only 1.6% as burnished sherds. Of the burnished sherds 96.1% were of fine grit whereas only 29.0% of the smoothed sherds were of fine grit. This means that 71.0% of the smoothed sherds were made with coarse grit temper.

The incised sherds from Area 1 and Feature 13 were divided, as were the incised sherds from the Bell Phase component of the site, into three groups based upon the width of the incised lines. Those incised lines less than one millimeter wide were denominated "fine", those over two millimeters called "bold", and the middle one to two millimeter range simply called "medium" incised. These same ranges, by the way, were used in analyzing the incised sherds from the Bell Phase portion of the site to be discussed shortly.

For the 1977 Duvall Phase sherds, the total number of incised sherds was 176 or 4.5% of the collection. Of these, 55 were simply labelled "unidentifiable" incised with no width category assigned and 14 were of the type Morgan Incised. Smith (1981) has discussed this latter type as a marker for the Duvall Phase in the Upper Oconee drainage. Indeed, as discussed in an earlier chapter, the first sherds of this type were recovered at 9Mg28 Area 1 in late 1968. The remaining 107 incised sherds are divided by width of incised line as follow. Ten sherds, or 9.3%, were of the "fine" incised type, 76 sherds or 71.0% were of the "medium" incised category, and 21 or 19.7% were of the "bold" incised group. These relative frequencies will be compared with those from the Bell Phase and differences will be noted.

A total of 56 (1.6%) stamped sherds were found in the 1977 work from the Duvall Phase component at the site. Of these 41 or 73.2% were identified as Lamar Complicated Stamped (Jennings and Fairbanks 1939). The rest of the stamped sherds were simply recorded as unidentifiable complicated stamped. As was shown above, stamped pottery, while rare in the Duvall Phase, is almost nonexistent in the later Bell Phase.

A total of nine ceramic pipe fragments and seven pottery discs were recovered from all Duvall Phase contexts. One fiber tempered sherd, an early woodland/late Archaic ware of no significance to this site was also recovered.

Analysis of rim sherds from the Duvall Phase portion of the site (just the 1977 work) is as follows (see Table 3). Out of a sample of 222 rims, 90 or 40.5% were of simple, straight unmodified form. The remainder or 132 sherds (59.5%) were "folded" rims, of the type characteristic of Lamar Period occupations throughout Georgia and adjacent states (Fairbanks 1952). For purposes of analysis these folded rim sherds from 9Mg28, both Duvall and Bell Phase material, have been broken into six categories. These are based upon modifications of the rim strip or fold and include the following: plain unmodified, punctated, pinched, scalloped, notched, and incised.

For the 132 Duvall Phase folded rims the counts and percentages are as follows. The most common form was the punctated fold of which there were 87 specimens forming 75.9% of the collection. Pinched folded rims were next with 24 specimens accounting for 18.2%. These two most popular forms were followed by incised with ten sherds (7.6%), scalloped with seven sherds (5.3%), and plain unmodified with four sherds (3.0%). There were no notched folded rim sherds from the

Table 3

9Mg28

Rim Sherds (1977)

| | Prov 1 | Prov 3 | Prov 6 | Prov 8 | Prov 10 | Prov 11 | Prov 12 | Prov 14 | Prov 16 | Prov 17 | Prov 18 | Prov 21 | Prov 22 | Prov 23 | Prov 24 | Prov 25 | Prov 26 | Prov 27 | Prov 39 | Sub Total | Prov 13 | Prov 15 | Sub Total | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Simple Unfolded | 84 | 1 | 1 | | 1* | 1 | 8 | 15 | 8 | 20 | 7 | 6 | 8 | 1 | | | 3 | 2 | | 166 | 17 | 73 | 90 | 256 |
| Folded Punctated | 10 | | | 1* | | | | 17 | 4 | 6 | 1 | | | | 1 | 1 | | | | 41 | 3 | 84 | 87 | 128 |
| Folded Pinched | 10 | | | | | | | 1 | 1 | 2 | 1 | | | 2 | | | 1 | | 14 | 32 | 17 | 7 | 24 | 56 |
| Folded Incised | 5 | | | | 1* | | | | 5 | 1 | | | | | | | | | | 12 | 9 | 1 | 10 | 22 |
| Folded Plain | | | | | | | 1 | | 7 | 2 | | | | | | | | | | 10 | 3 | 1 | 4 | 14 |
| Folded Scalloped | 6 | | | | | | | | | 4 | | | | | | | | | | 10 | 7 | 0 | 7 | 17 |
| Folded Notched | 1 | | | | | | | | | | | | | | | | | | 4 | 5 | 0 | 0 | 0 | 5 |
| Totals | 116 | 1 | 1 | 1 | 2 | 1 | 9 | 33 | 25 | 35 | 9 | 6 | 8 | 3 | 1 | 1 | 4 | 2 | 18 | 276 | 56 | 166 | 222 | 498 |

* These sherds are from post holes beside Features 8 and 10.

Duvall Phase component. The most obvious difference in terms of rim forms between the Duvall and Bell Phase is the high proportion of punctated rims in the former, as we shall shortly see.

As with the Duvall Phase ceramics, the Bell Phase ceramics were analyzed differently for the 1969 excavations and the 1977 excavations. Further, the Bell Phase ceramic analysis was further complicated by the circumstances surrounding the discovery of Features 1 and 2 in 1969. Both of these features yielded large numbers of reconstructable vessels. These vessels were reconstructed prior to typing the pottery by sherd. Virtually all of the sherds from Features 1 and 2 were either plain or incised. Although the total sherd counts were made after the vessels were reconstructed, the counts of plain vs. incised have not been redone and thus are not reported here. The total sherds from Feature 1 was 2941 and the total from Feature 2 was 746. Together these make up 29.6% of the sherds from Bell Phase context and cannot thus be further analyzed as sherds at the present time. The analysis of the ceramic vessels from these and other features analyzed as containers is presented in the following chapters.

An additional 5205 sherds were recovered from the sand redeposited layers in Area 2 immediately south of the major Bell Phase occupation of the site in 1969. These represent 41.8% of the Bell Phase sherds from the site and were analyzed quite simply as follows. Plain body sherds accounted for 4098 sherds or 78.7% of the total. Incised body sherds numbered 541 and thus formed 10.4% of this 1969 collection while stamped sherds formed only .8% of the sherds with a count of but 44. Some of these stamped sherds may have been intrusive from Area 1 through actual overlap of the two phase distributions or may be a result of human error in the gathering and storing of these materials. In any event, it is clear that the proportion of stamped pottery is less in the Bell Phase component. In fact, the percentage of Bell Phase stamped pottery may actually be zero. As we shall see shortly, for features which produced pottery assignable to the Bell Phase (5, 12, 15, 18, 19), as opposed to surface or redeposited disturbed proveniences, only three sherds out of 1830 were stamped. This amounts to only .16% from good context and three sherds could easily have been intrusive into the later Bell Phase features.

Finally, for the 1969 Area 2 excavations 480 rim sherds were recovered. This represents 9.2% of that collection. Details of the variations in these rim sherds are not readily available at this time, but data is present for the main portion of the Bell Phase component rim sherds and this data, to be presented shortly, is undoubtedly similar to that from 1969.

For the ceramic material recovered from the main portion of the site in 1977 the same categories discussed above for the 1977 work in the Duvall Phase portion of the site were used. For the Plain sherds a total of 3073 sherds represented 86.7% of the sherds. This was slightly smaller than the 92.0% found in the Duvall Phase, collection from 1977. Of these plain sherds 2910 or 94.7% were simply smoothed while 163 or 5.3% were classified as burnished. Thus although there is still but a small proportion of burnished plain pottery in the Bell Phase collections, it is over three times as popular (5.3% vs. 1.8%) as in the Duvall Phase. The subjectivity of identifying smoothed vs. burnished surfaces on all this pottery makes these figures somewhat suspect however. Within the "smoothed" plain category, 1901 sherds or

65.3% were of coarse grit temper while 1009 or 34.7% were classified as having fine grit. There is slightly less coarse temper in the "smoothed" ware than was present in the Duvall Phase (71.0%). Within the burnished plain category, 143 out of 163 sherds or 87.7% were of fine grit while only 20 or 12.3% were of coarse grit. This is a slightly smaller proportion of fine grit in burnished sherds than in the Duvall Phase (96.1%).

The 1977 incised sherds catalogued from Area 2 and the "main part" of the site totaled 306, although at least 18 of these are Morgan Incised sherds of doubtful provenience (mostly from surface collections). Ignoring these for the moment, as well as 41 unidentified incised sherds for which incised line width was not recorded, 265 sherds belonging to the Bell Phase remain. Of these 58 or 21.9% were "fine" incised, 184 or 69.4% were "medium" incised, and 23 or 8.7% were "bold" incised. The difference between this collection and that of the Duvall Phase are distinct. While the percentage of "medium" width incised lines is essentially the same (69.4% vs. 71.0%), the other two line width types are reversed in their proportions. Bold incised, which had been 19.7% in the earlier phase was only 8.7% in the later phase while the fine incised, which had been 9.3% in the former was up to 21.9% in the latter. Thus, the proportion of wide lines decreased and the proportion of thin lines increased through time. It must be remembered that there is an intervening Dyar Phase for the whole Oconee area, although it was not represented at 9Mg28. Whether this pattern continues through the intervening phase is unknown at this time, but this pattern is certainly true for Central Georgia as a whole (Fairbanks 1952) although it may or may not represent actual continuity of human cultures.

Of the 48 stamped sherds found on the main part of the site in 1977 only three were from good Bell Phase context as pointed out above. Thus although these 48 sherds account for 1.4% of the 3546 sherds from the main part of the site in 1977, it is quite likely that no stamping of the surfaces of pots was done during Bell Phase. In fact, of 118 vessels reconstructed for the site only one has a possible stamped design and this may just be a roughened surface vessel.

A total of 51 sherds were classified as unidentified decorated (most are undecorated in fact), 13 as weathered, and five as pinched surfaces. None of these showed up on vessels and represent small sherds that should have been distributed to other categories.

Twenty fragments of clay pipes were found in 1977 to augment the 38 pieces found in 1969. A total of eight pottery discs were recovered from Bell Phase contexts from 1969 and 1977.

A total of 276 rim sherds were identified from the 1977 Bell Phase work at 9Mg28 (Table 3). Of these 166 or 60.1% were simple, straight, plain rims. The remaining 100 or 39.9% were folded rims of the various types discussed above for the Duvall Phase rim sherds. These figures are almost exactly the reverse of those for the Duvall Phase: 60.1% vs. 40.5% for the simple rims and 39.9% vs. 59.5% for the folded rims.

Within the folded rim category, the breakdown was as follows. The most common form, just as in Duvall Phase, was the punctated form for which there were 41 present accojnting for 37.3% of the folded rims. This was followed, again as in Duvall Phase, by pinched with 32 sherds (29.1%) and incised with 12 sherds (10.9%). Plain folds and scalloped folds accounted for ten sherds each (9.1% each) while notched folds accounted for the remaining five sherds (4.5%). While relative popularity of all of these modified rim types is the same for Bell and Duvall Phases, there are a few differences in the collections. While the proportion of punctated folded rims was 37.3% in the Bell Phase as just mentioned, it was 65.9% in the Duvall Phase. This form, while still the most common in Bell Phase, was not nearly as important as it had been in Duvall Phase. In taking up the slack for the relative loss of popularity of this form, all of the other forms were more popular. Pinched folded rims went from 18.2% to 29.1%; incised folds went from 7.6% to 10.9%; scalloped folded rims went from 5.3% to 9.1%; plain folded rims went from 3.0% to 9.1%; and notched folded rims went from 0% to 4.5%. The differences betwen the rim forms of Duvall and Bell Phases are most apparent when the decrease in relative proportions of the punctated folded rims are compared to the increase in relative proportions of simple, unmodified rims. For the Duvall Phase occupation, the ratio of simple plain rims sherds (90) to punctated folded rims (87) is 1.04 to 1 while for the Bell Phase component the ratio of the simple plain rims (166) to folded punctated rims (41) is 4.05 to 1. In a large collection of rim sherds this device alone may be used to judge, even if all the sherds had plain undecorated bodies, to which phase the collection should belong.

The following portion of the ceramic analysis restricts itself to the sherds from eight locations, all of Bell Phase, on the main part of the site. This analysis is to deal simply with the quantification of the material from Features 1, 2, 5, 12, 15, 18, 19 and post hole 622. A few comments are necessary for the last location. This post hole, found four feet south of Feature 10, just north of the wall of the rotunda Feature 55, was excavated when it was apparent that a few pot sherds were included in the fill at the top. This unusual post hole was filled with just over nine pounds of pot sherds forming parts of at least two partial pottery vessels. The post hole was .75 feet in diameter and 1.1 feet deep below the scraped village surface. This was not described as a feature in the preceeding chapter although it is certainly an unusual post hole. There was too much pottery in the hole to explain the sherds presence as being used to help prop up or stabilize a post. Perhaps the sherds were put into the hole after a post was removed. No known or speculated explanations for the existence of this small cache are posited.

For the eight locations under discussion here a total of 5735 sherds were recovered. The collective weight of these sherds was 136,791.25 grams (301.57 pounds). For all of these locations collectively the correlation coefficient (Pearson's r) between the number of sherds and the weight of the sherds is .984. This means that the weight is an almost perfect predictor of the sherd count and vice versa. Thus, for future work, either of these quantities (counts or weights) may be taken, whichever is more easily done, and the other predicted. If the sherds from Feature 1, in which the average sherd size was significnatly larger than that of all the other features, are temporarily excluded from the calculations, a slightly higher correlation of .994 is derived. The regression equation for predicting the number of sherds (y) based upon the weight of those sherds (x) is $y = .0555\ x - 5.98$. This formula should be of general utility in midden collections from other sites. The basic point here is that either counts or weights of sherds are equally useful in estimating quantities of sherds.

The mean sherd weight for all the eight features under consideration here was 23.85 grams when calculated for all sherds and weights together, although if calculated by the mean weight per feature (the mean of the mean sherd weight by feature) the result is only 20.35 grams (standard deviation = 4.42 grams). The differences is due to the large number of big sherds from Feature 1.

From all these eight proveniences a total of 118 vessel numbers were assigned to reconstructed fragments. These vessels are discussed in greater detail in the following chapters. Of course a large number of sherds were not assigned to any vessel in each feature. Of the 5735 sherds under discussion here, 2937 or 51.21% were assigned to pottery vessel reconstruction leaving 2798 or 48.79% unassigned. Thus only about half of the sherds were assigned to specific pots based upon sherd counts alone. An examination of the distribution of sherds by weight, however, shows that a far greater proportion of the pottery recovered was assigned. Of the 136,791.25 grams of pottery in these features 110,428.7 grams or 80.73% were assigned to vessels. Thus only 26,362.55 grams or 19.27% were left unassigned. The reason for this difference between counts and weights is easy to explain--simply because large sherds (and thus heavier sherds) are more likely to be fit into a reconstructable vessel than very small ones, thus increasing the sherd count of unassigned sherds more rapidly than their weights. Thus, in this case, the use of weights makes more intuitive sense than does counts. To look at the results it makes more common sense to say that 80.73% of the sherds (by weight) were assigned than 51.21% of the sherds (by count).

Feature 1 had a total of 2941 sherds weighing 85,693 grams for a mean sherd weight of 29.14 grams. A total of 62 vessels and reconstructable fragments were included in the collection. For these sherds, 1633 (55.53%) were assigned and 1308 (44.47%) were unassigned. By weight, 74,174 grams were assigned (86.56%) and 11,519 grams were unassigned (13.44%). The total weight converted to pounds was 188.92, a huge amount of pottery from one feature. The vessels were all either plain or incised, many with fine line incised designs.

Feature 2 contained a total of 746 sherds of which 397 (53.22%) were assigned to any one of the 16 vessel fragments reconstructed. Thus 349 sherds (46.78%) were unassigned. The total weight was 14,865.5 grams and the mean sherd size was 19.93 grams. By weight 11,211 grams (75.42%) were assigned and 3654.5 grams (24.58%) were unassigned. The converted weight of the sherds in this shallow feature was 32.77 pounds, the third most from any feature.

Feature 5 had 1308 sherds 597 (45.64%) of which were assigned and 711 (54.36%) of which were unassigned. The total weight of the sherds was 22,956.35 grams (50.61 pounds) and 17.55 grams was the mean sherd weight. A total of 29 vessel fragments were reconstructed. Although less than half of the sherds by count were assigned, 74.71% (17,150.2 grams) of the sherds by weight were included in the reconstructed vessels leaving only 25.28% (5806.15 grams) unassigned.

Feature 12 contained only 109 sherds weighing a total of 1937 grams (4.27 pounds). The mean sherd weight was 17.77 grams. Only one vessel fragment was reconstructed containing 23 sherds (21.1% of sherds). Thus 86 sherds or 78.9% were unassigned. The vessel fragment weighed 805 grams or 41.56% of the total sherd weight in the feature.

The unassigned 86 sherds weighed 1132 grams or 58.44% of the total weight.

Feature 15 had 322 sherds in it which weighed a total of 4546.1 grams (10.02 pounds). The mean sherd weight was 14.19 grams, the lowest of any of the features. Six vessel fragments were recovered which included 118 sherds (36.65%) and weighed 2646 grams (58.20%). Thus 204 sherds representing 63.35% of the total sherds were unassigned. These weighed 1900.1 grams or 41.80% of the total weight of sherds. It is remarkable that Feature 15, which was similar in size to Feature 5, had much fewer ceramic debris.

Feature 18 contained but 667.4 grams (1.47 pounds) of pottery sherds and accounted for a total of but 34 sherds. Thus by both weights and counts, this feature contained less pottery than any of the other features under consideration here. But one vessel fragment weighing 527.5 grams (79.04% of total pit sherd weight) and containing 21 sherds (accounting for 61.76% of the sherds by count) was reconstructed. The mean sherd weight for the feature was 19.63 grams.

Feature 19, the companion to Feature 18, contained 95 sherds weighting 2039.4 grams (4.45 pounds). The mean sherd weight was 21.47 grams. Again, but one vessel fragment was reconstructed. This included 62 of the pit's sherds (65.26%) but contained 93.78% of the weight of the sherds for the feature (1912.5 grams). Thus while the 23 sherds which were unassigned accounted for 34.74% of the sherds these amounted to but 6.22% of the weight of all the sherds in the feature.

Posthole 622, discussed earlier, had 180 sherds weighing 4086.5 grams (9.01 pounds). The mean sherd weight was 22.70 grams. Two vessels both plain, were reconstructed from these sherds. A total of

86 sherds or 47.77% were included in these vessels. Thus 94 or 52.23% were unassigned. The weight of the assigned sherds was 2002.5 grams or 49.00% of the total weight leaving 2084 grams or 51.00% unassigned. It should be mentioned that two large body fragments were included in the unassigned category which weighed 740.5 grams together. With these included with the weight of assigned vessel sherds a total weight of 2743 grams or 67.12% are accounted for.

The use of formal pottery type names has been intentionally avoided in this report for several reasons. First, none of the presently existing names are appropriate for this material. Although the material is close in time and space to the Ocmulgee Old Fields material from the Macon area (Jennings and Fairbanks 1939), it is quite different in key respects. The rim forms are different. No red filming is present at 9Mg28. The vessel shapes are far closer to earlier Central Georgia Lamar forms (Fairbanks 1952). The majority of the incised lines are not the crude "degenerated" forms known for Ocmulgee Fields, but are, in fact, some of the best incising ever done in the Southeast, rivaling in some cases some of the best Caddo pottery for style and execution (Orr 1952). Thus, existing names are of no help and, if names are to be used, new ones must be devised. The need for this is further questioned when it is also realized that we can be confident within 20 or 30 years of the date of manufacture of the material anyway (1630 A.D.). Further, the major use of this pottery at this site will be to study use, meaning, and function of the vessels to the people who made them, and names of the traditional sort are unnecessary for this purpose. In this light we may conclude by saying that a large number of pots of many shapes and varieties were used at the Joe Bell site. Two quotations from James Adair are appropriate here: "They make earthen pots of very different sizes, so as to contain from two to ten gallons; large pitchers to carry water; bowls, dishes, platters, basons (sic) and a prodigious number of other vessels of such antiquated forms, as would be tedious to describe, and impossible to name" (Williams 1973: 456). He says further: "Their domestic utensils consist of earthen pots, pans, jugs, mugs, jars, etc. of various antiquated sorts, which would have puzzled Adam, to have given them significant names" (ibid: 452). One can only hope that Adair was incorrect in his judgment, although at present they still retain much of this puzzling character.

## Lithics

The lithic material from the Joe Bell site is of relatively small interpretive value in comparison to the ceramics. The reasons for this are several. First, the amount of lithic material recovered was not large. Further, because of the plowed nature of the site, most of the recovered material was from poor contexts, either from the surface or in redeposited sands. Because the site was stripped to reveal features, the small amount of lithic material recovered in the shovel scraping operations by 50 foot square was but doubtfully representative of the lithic debris in the removed soil. Perhaps the most serious problem with the lithic collection is that of assigning dates or phase designations to the collections. This was made further difficult by the fact that there was an Early Archaic occupation on the site of unknown size. Feature 29, discussed earlier, showed conclusively through the presence of a Dalton projectile point and an Edgefield scraper that people using stone had lived at the site long before either the Duvall or Bell Phase inhabitants. Although both of the two above mentioned tools were made of an easily recognizable, nonlocal light colored metamorphosed sandstone, a large quantity of quartzite chips were also present in the same area. If all of the Early Archaic material had been of the peculiar metamorphosed stone separation by time period would have been easy. It appears that these early people were also chipping local quartzite, however, and one can not be sure if a given flake was made 9000 years ago or just 300 years ago. In the shovel scraping operation, the heaviest concentration of quartzite chips was centered on Feature 29, although chips were recovered from the whole site.

Plate 10 shows all of the projectile points found at the site in 1977. A diversity of forms were present, most of which would, based upon traditional typologies (Coe 1964, Cambron and Hulse 1975, Bullen 1975) be assigned to Early to Middle Archaic dates, although one or two might be comfortably placed into Woodland period groupings. There were no small triangular projectile points associated with either the Duvall or Bell Phases at the site. It would appear that weapons for hunting or fighting for these periods were either not used, or, more likely, were made from other materials. In opposition to this view, however, certainly the Lamar Period peoples (both Duvall and Bell Phase) surely used stone tools for some purposes and much of the lithic debris on the site was surely left by them. The problem is in estimating how much of the debris at the site belonged to each period. The most obvious way to get an estimate of this sort was to segregate the lithic material from features known to date to certain times from the other material, and this was done. It must be realized, however, that even this does not completely ensure total segregation because older material present

Plate 10 - Projectile Points

in the village could and certainly did occasionally get accidentally in-included in the fill of later period features.

No definite Early Archaic material was found in the portion of the site which was predominately Duvall Phase, and so these units (Feature 13 and material from the sand layers in Area 1) were lumped as the Duvall Phase area, although this does not mean that all the lithics so labeled are definitely of the Duvall Phase. For the main part of the site the lithic data has to be lumped and is reported here knowing it represents a mixture of materials (Table 4). (See Appendix A also.) The feature data for Bell Phase is also presented and, although this more likely represents material used at that time, even this, as pointed out above, cannot be certain (Table 6). This is discussed in more detail below.

A total of 1086 stone fragments were recovered from the site in 1977. Although a small amount of lithic material had been recovered in 1969, this is not included in the present analysis. Of the 1086 stone items recovered, 1032 or 95.0% were flaked stone pieces, the remaining 54 being non-chipped remains. The flaked stone will be discussed first. A total of 924 flaked stone items were recovered from the main part of the site. This represented 89.5% of the recovered flakes stone. The remaining 108 chipped stone fragments, representing but 10.5% were from the Duvall Phase part of the site (Table 5). (See Appendix A also.) A few comments about this table are necessary.

Almost all of lithic material from Area 1 was flakes. These, as were all flakes from the site, were classified by material and, for whole flakes, whether they were of percussion or retouch origin based upon examination of their characteristics. Broken or partial flakes

Table 4

9Mg28

Main Site
Flaked Stone

| | Prov 1 | Prov 2 | Prov 3 | Prov 4 | Prov 6 | Prov 7 | Prov 8 | Prov 9 | Prov 10 | Prov 11 | Prov 14 | Prov 16 | Prov 17 | Prov 18 | Prov 20 | Prov 21 | Prov 22 | Prov 23 | Prov 25 | Prov 26 | Prov 27 | Prov 28 | Prov 32 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Uniface Tools | | | | | | | | | | | | | | | | | | | | | | | | |
| Light Chert | 2 | | | | | | | | | | 2 | | | 1 | | 3 | | | 1 | 1 | | | 1 | 11 |
| Quartzite | 4 | | | | | | | 1 | | | 4 | | | 14 | 15 | 6 | 2 | | | 2 | 3 | | | 51 |
| Bifaces | | | | | | | | | | | | | | | | | | | | | | | | - |
| Projectile Points | | | | | | | | | | | | | | | | | | | | | | | | - |
| Whole or Tip | | | | | | | | | | | | | | | | | | | | | | | | - |
| light chert | | | | | | | | | | | | | | | 2 | | | | | 2 | | | | 4 |
| dark chert | | | | | | | | | | | 1 | | | | | | | | | | | | | 1 |
| quartzite | 1 | | | | 1 | | | | | | 3 | | | | 1 | 1 | | | | 1 | | | | 8 |
| Haft | | | | | | | | | | | | | | | | | | | | | | | | - |
| light chert | | | | | | | | | | | 1 | | | | | | | | 1 | | | | | 2 |
| quartzite | | | | | | | | | | | | | | | 1 | | 1 | | | | | | | 2 |
| Cordiform (quartzite) | | | | | | | 1 | | | | | | | | | | | | | | | | | 1 |
| Lanceolate (quartzite) | | | 1 | | 1 | | | | 1 | 1 | 2 | | | | | 2 | 1 | | | | 1 | | | 10 |
| Triangular (quartzite) | | | | | | | | | | | | | | | | | | | | | 2 | | | 2 |
| Drill (quartzite) | | | | | | | | | | | | | | | | | | | | | 1 | | | 1 |
| Fragment (quartzite) | 2 | | | 1 | | | | | | | | | | 5 | 3 | 4 | | | | | 1 | | | 16 |
| Flakes | | | | | | | | | | | | | | | | | | | | | | | | - |
| Percussion | | | | | | | | | | | | | | | | | | | | | | | | - |
| light chert | | | | | | | | | | | | | | | 2 | | | | | | | | | 2 |
| quartzite | | | 1 | | | | | 2 | | | | | 1 | 10 | 7 | 6 | 3 | | | 4 | 7 | | | 41 |
| Retouch | | | | | | | | | | | | | | | | | | | | | | | | - |
| light chert | 4 | | | | | | | 2 | | | | 1 | | | 7 | | | | | 1 | 1 | | | 16 |
| quartzite | 14 | | | 2 | 1 | | 1 | 7 | 1 | 3 | 5 | 3 | 8 | 35 | 58 | 15 | 2 | | 1 | 3 | 27 | | | 186 |
| Debris | | | | | | | | | | | | | | | | | | | | | | | | - |
| light chert | 7 | | | 1 | | 2 | 1 | 5 | | | 12 | 5 | 1 | 5 | 5 | 2 | 1 | 1 | | 2 | 5 | 1 | | 56 |
| chalcedony | | | | | | | | | | | | | | | | 1 | | | | | | | | 1 |
| quartzite | 35 | 2 | 3 | 2 | 1 | | 1 | 22 | | 2 | 35 | 27 | 22 | 57 | 115 | 31 | 20 | | 1 | 21 | 91 | | | 488 |
| Cores | | | | | | | | | | | | | | | | | | | | | | | | - |
| Light Chert | | | | | | | | | | | 1 | | | | | | | | | | | | | 1 |
| Quartzite | 4 | | | | | | | | | | 3 | | 1 | | 3 | 2 | 5 | | | 3 | 3 | | | 24 |
| Totals | 73 | 2 | 5 | 6 | 4 | 2 | 4 | 39 | 2 | 6 | 69 | 36 | 33 | 127 | 219 | 73 | 35 | 1 | 4 | 40 | 142 | 1 | 1 | 924 |

Table 5

9Mg28, Area 1

Flaked Stone

| | Provenience 13 | 15 | Totals |
|---|---|---|---|
| Uniface Tools | | | |
| Light chert | | 1 | 1 |
| Chalcedony | 1 | 1 | 2 |
| Quartzite | | 1 | 1 |
| Biface (light chert) | | 1 | 1 |
| Flakes | | | |
| Percussion (quartzite) | | 1 | 1 |
| Retouch | | | |
| light chert | | 1 | 1 |
| dark chert | | 1 | 1 |
| chalcedony | | 2 | 2 |
| quartzite | 2 | 13 | 15 |
| Debris | | | |
| light chert | | 27 | 27 |
| dark chert | | 4 | 4 |
| chalcedony | | 3 | 3 |
| quartzite | 1 | 48 | 49 |
| Totals | 4 | 104 | 108 |

were simply classified as debris, although material type was noted. For all of the 108 flaked stone fragments recovered from this part of the site, 67 or 62.0% were of quartzite and 41 or 38.0% were of chert. As will be shown this is a far greater proportion of chert as a raw material than is present on the site as a whole. It should be pointed out that, although quartzite occurs on the site itself, there are no chert outcrops or sources at the site and must have been obtained from the sources.

For the main part of the site, which includes, as discussed above, both Early Archaic and Bell Phase lithics in unknown proportions, the figures are recorded in Table 4. Of the 924 flaked stone items present here 62 or 6.7% are Unifacial tools. Of these 17.7% are of light chert and 82.3% are of quartzite. A total of 47 bifacially flaked tools were recovered. For all of these 40 or 83.3% were of quartzite and 17 or 16.7% were of chert. Of the chert bifaces, only one was dark black colored and the rest were light tan colored. It should be pointed out that although the dark chert was quite rare on the site, 83.3% (five out of six) were on the Duvall Phase part of the site rather than the main part. The shapes of these points and bifaces, no one of which is predominant are also listed in Table 4.

The majority of flaked stone from the main part of the site consists of flakes. A total of 790, forming 85.5% of this material, were recovered. These are divided as follows: 43 or 5.4% were percussion flakes, 202 or 25.6% were retouch flakes, and 545 or 69.0% were debris. Among the percussion flakes 95.3% were of quartzite and 4.7% were of light colored chert. For the retouch flakes 92.1% were of quartzite and 7.9% were of light chert. Finally, for the flake debris, 89.5%

were of quartzite, 10.3% were of light colored chert, and .2% were of chalcedony.

A total of 25 cores were found on the site, all of which were on the main part, none being recovered from the Duvall Phase part. Of these 25 cores, 24 or 96% were of quartzite and one was of light chert. In this connection it is also noteworthy that 29 cortical or partial cortical flakes were recovered from the main part of the site. This represented 3.7% of the flakes from that part of the site and 39.2% of the chert flakes. No cortical flakes were found in the Duvall Phase portion of the site. It is thus apparent that no primary stone reduction was being done in the latter component at this site, but was being performed on the main part. Whether the latter was of Bell Phase or of Archaic origin is unknown.

In order to define better the lithics of the Bell Phase Table 6 was created from the above data and presents just the lithic information from known Bell Phase features. The total from the features was only 158 fragments or only 17.1% of the flaked stone from the main part of the site. These include eight unifacial tools (5.0% of the feature collection) of which five (62.5%) are of quartzite and three (37.5%) are of light colored chert. Six biface tools, only one of which was of light chert and the rest quartzite, were found in the group. None of these can be easily assigned typologically to any particular time period based on past knowledge. These collectively represented 3.8% of the feature flaked stone. Not surprisingly, flakes formed the largest group, comprising 88.0% of the total with a count of 139. These can be divided as follows. Three or 2.2% were percussion flakes, all of which were of quartzite. There were 38 retouch flakes, forming

Table 6

9Mg28, Bell Phase Features

Flaked Stone

| | Feat 5 | Feat 7 | Feat 8 | Feat 9 | Feat 10 | Feat 15 | Feat 18 | Feat 19 | Total |
|---|---|---|---|---|---|---|---|---|---|
| Uniface Tools | | | | | | | | | |
| Light Chert | 2 | | | | | | | 1 | 3 |
| Quartzite | 4 | | | 1 | | | | | 5 |
| Bifaces | | | | | | | | | |
| Projectile Point (quartzite) | 1 | | | | | | | | 1 |
| Haft (light chert) | | | | | | | | 1 | 1 |
| Cordiform (quartzite) | | | 1 | | | | | | 1 |
| Lanceolate (quartzite) | | | | | 1 | | | | 1 |
| Fragment (quartzite) | 2 | | | | | | | | 2 |
| Flakes | | | | | | | | | |
| Percussion (quartzite) | | | | 2 | | 1 | | | 3 |
| Retouch | | | | | | | | | |
| light chert | 4 | | | 2 | | | | | 6 |
| quartzite | 14 | | 1 | 7 | 1 | 8 | | 1 | 32 |
| Debris | | | | | | | | | |
| light chert | 7 | 2 | 1 | 5 | | 1 | 1 | | 17 |
| quartzite | 35 | | 1 | 22 | | 22 | | 1 | 81 |
| Cores (quartzite) | 4 | | | | | 1 | | | 5 |
| Totals | 73 | 2 | 4 | 39 | 2 | 33 | 1 | 4 | 158 |

27.3% of the flakes. Of these, 32 or 84.2% were of quartzite and 6 (15.8%) were of light colored chert. As usual, the most common category was that of debris. A total of 98 broken or incomplete flakes were present in the features representing 70.5% of the total flake count. Of these 82 (82.3%) were of quartzite and 17 (17.3%) were of light colored chert. Additionally a total of 5 quartzite cores were recovered from the Bell Phase features. For the features as a group there were 27 light colored chert items forming 17.1% and 131 quartz items forming 82.9% of the total. These figures are exactly (even to the tenth of a per cent!) the same as for the main part of the site. Further, the percentages by category are also similar in proportion, generally within three percent or less. This means that the population of flaked stone items in the Bell Phase features is nearly identical to that for the site around it and quite possibly is of Bell Phase rather than the Early Archaic although this can never be certain. It is also possible that the items in the features are a random mixed selection from the Early Archaic material that may have been scattered over the entire site. Based on the feature evidence, however, I tend to believe the former idea that these are Bell Phase artifacts. Analysis of lithic material from other Bell Phase sites in the future will help clear this problem.

A total of 54 stone items from 9Mg28 were divided into a number of categories of non-flaked stone by laboratory workers. This data as recorded is listed in Table 7 (see Appendix A again). The most common single category listed as unidentified ground stone fragments which accounted for 64.8% of the total. Most of the categories listed here, as well as the tools, are for crude non-formally ground items and the

Table 7

9Mg28

Non-Flaked Stone

| | Prov. 1 | Prov. 4 | Prov. 9 | Prov. 13 | Prov. 14 | Prov. 18 | Prov. 20 | Prov. 21 | Prov. 22 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| Pounder | 1 | | 1 | | | 2 | | | 1 | 5 |
| Mano | | | | | | 1 | | | | 1 |
| Shaped Hammerstone | | | | | | | | 1 | | 1 |
| Grinding Slab | | | | | | 3 | | | | 3 |
| Grooved Stone | | 1 | | | | 2 | | | | 3 |
| Adze (?) | | | 1 | | | | | | | 1 |
| Chunkey Stone Fragment | | | | | 1 | | | | | 1 |
| Unidentified Ground Stone Fragment | 6 | | 3 | 1 | | 19 | 1 | 2 | 3 | 35 |
| Edge Ground Implement | 1 | 1 | | | 2 | | | | | 4 |
| Totals | 8 | 2 | 5 | 1 | 1 | 29 | 1 | 3 | 4 | 54 |

distribution of items across categories is indeed somewhat arbitrary. Most of these stone pounders for instance are simply battered hand-sized rocks, usually of non-quartz igneous rocks. The only polished ground stone item was a surface find of a chunkey stone fragment. A few other items had use wear although this has not been studied in detail to this point. As with the flaked stone (all but one non-flaked stone was from the main part of the site rather than the Duvall Phase part of the site) it is very difficult to assign the non-flaked stone to specific time periods, although one would guess that most of it does belong to the Bell Phase. Some of the grinding slabs may have been used to grind plant foods, but this is uncertain here. The presence of some non-flaked items in Feature 9 further substantiates the feature's human origin as opposed to any supposed natural origins. In general, the small size of the collection, the extreme crudeness of almost all of the items, and the generally poor provenience data all combine to limit the interpretive usefulness of this collection.

## CHAPTER 7

### Vessel Analysis - Introduction

The reconstructable pottery vessels from 9Mg28 provide a rare opportunity to study a large collection of vessels from a fairly small early historic site in the Southeast. In fact this collection may be one of the largest for an excavated site of this size in the entire Southeast. There is no particular need to study this collection from a chronological point of view because the date for the site is fairly well established. The questions to be asked about the collection (both as individual vessels and groups) are ones of form, use, function, and meaning. The latter two are certainly less accessible and thus the emphasis will be on the study of the form and use of the vessels.

At one level, the use of all ceramic vessels is the same--that is, they are all containers for something. The use of containers of all sorts is a distinctly human trait and one that probably developed quite early in man's history (Isaac 1978). The use of fired clay (ceramic) materials for containers dates only from the adoption of relatively sedentary life styles for human groups. This is generally attributed to the breakable nature of certamic containers. For settled peoples, however, ceramic containers offer a number of advantages over other containers. They are relatively easy to make once the technology is mastered, they are generally impervious to water, and can therefore be used as containers for liquids as well as solids, and they are essentially unaffected by heat and thus are excellent containers in which to cook food. These three characteristics have made ceramic containers extremely useful among technologically simple sedentary peoples around the world. In modern, technologically complex societies glass and metal have replaced ceramics for most containers.

Cultural anthropologists and ethnographers in the past have often failed to record adequate information about the form, use, function, and meaning of ceramic containers in technologically simple societies. This is unfortunately for the archaeologist, for whom ceramic data is often one of the most necessary tools for studying past societies. This lack of good observational data is not too surprising because social systems and belief systems have traditionally been viewed as being more important in understanding the lifeways of peoples by many cultural anthropologists.

As part of increasing interest among archaeologists and also cultural anthropologists and linguists, several recent studies have been done on living societies whose members still manufacture and use ceramics. These studies are part of an overall effort to create analogs through which archaeologically recovered ceramic containers can be better understood in the context of the societies and individuals that created them. Studies which wholly or partially deal with ceramics among living societies have been done in Mexico (Foster 1948, 1960; Weigand 1969; Pastron 1974; Kaplin and Levine 1981), in Peru (DeBoer 1974; DeBoer and Lathrap 1979), in the American Southwest (Stanislawski 1969, 1978), in Africa (David 1972; David and Hennig 1972), and in the Phillipines (Longacre 1974). Hally (1980b) has outlined five major topics as revealed by these studies - "1) The relationship between vessel form and function [i.e. use]; 2) The composition of domestic ceramic assemblages; 3) the use-life of pottery vessels in domestic contexts; 4) The recycling of broken vessels; and 5) Patterns of pottery discard" (Hally 1980b:2). To these at least one more area of ethnographic analysis can be added, that of the description of a folk taxonomy of ceramic vessels--that is, how do the people actually classify their full range of ceramic containers? This question has been examined by Kaplan and Levine for Puebla, Mexico (1981).

Several authors in recent years have attempted to utilize the above recorded ethnographic data as well as any other available ethnographic information to help learn more about the ceramic systems of peoples known only from archaeological data. The ethnographic information typically is used to create analogues to aid in explaining or understanding the archaeologically recovered data. Among the studies which are included here are Hill (1968), Morris (1971), Turner and Lofgren (1966), Braun (n.d.), and Hally (1980b) mentioned above. The premise behind these and many others like them is that it is possible to learn much more about past societies through studies of their ceramic remains than has been accomplished up to this point. Indeed, southeastern archaeologists used ceramics primarily as time markers for dating archaeological sites until the last decade. They certainly are our most time and space-sensitive artifacts, but they need not be limited to that role.

If little work on ceramic container use has been done nationwide, certainly the work done in the Southeast U.S. is even rarer. Of the studies mentioned above, only Hally's work (1980a,b) relates to this area. Additionally, the work of Steponaitis (1980) at Moundville has made a beginning in ceramic vessel analysis. Current work by Shapiro for the Oconee River area of Georgia also is addressing this problem. Finally, Dickens and Chapman (1978) have attempted to discuss vessel use in East Central Alabama during the late historic period.

Research into the forms and uses of ceramic containers (let alone meanings and functions) among the prehistoric Indians of the Southeast is severely hampered by the relative lack of ethnographic information on ceramics among the historically recorded human groups from this area of the country. In John Swanton's encyclopedic summary of the recorded information on the Southeastern Indians (1946) only six out of close to 1000 pages of text were devoted to ceramics, much of this being based on his own early 20th century observations in Oklahoma. The only pre-18th century reports are side comments by some of the DeSoto chronicles simply acknowledging the existence of ceramics among some of the Indian groups. Conquistadors were definitely not interested in the details of native ceramic systems.

Our best, albeit minimal, observers of native ceramics were the usual 18th century informants. DuPratz, Dumont, and Hariot all agree that it was women who made pottery. While several of the observers record some of the details of selecting the clay, preparing it, creating the vessels and firing them, these technological details are of less immediate concern here. Suffice it to say that all agree that the vessels were not wheel made and were fired on open fires rather than enclosed kilns.

Reference to vessel shapes and sizes are more useful for determining vessel use. References of this sort include the following. Biedma speaks of "little pots" among the Chickasaw (Swanton 1946:549). The Gentleman of Elvas speaks of "large pots" used to make salt, probably in what is now southern Arkansas (ibid: 549). Laudonniere in 1586 on the east coast of Florida describes "a great vessle of earth made after a strange fashion" (ibid: 551). In the lower Mississippi Valley, possibly among the Natchez, DuPratz describes the early 18th century vessels as "pots of an extraordinary size, jugs with a medium sized opening, bowls, two-pint bottles with long necks, pots or jugs for bear's oil, which hold as many as 40 pints, also dishes and plates like those of France" (ibid: 549). Also for the lower valley Dumont describes first "all kind of earthen vessels, dishes, plates, pots to put on the fire, with others large enough to contain 25 to 30 pots of oil" (ibid: 550). In another place he states that "they make all sorts of utensils of earth, dishes, plates, pans, pots, pitchers, some of which contain 40 or 50 pints" (ibid: 550). Penicaut describes the vessels of the Pascagoula of coastal Mississippi during the very early 18th century by saying that they have "large earthen pots, almost like big kettles, which hold perhaps 40 pints and in which they have hominy cooked enough for two or three families" (ibid: 550-1). Swanton further adds that "the cooks [were] taking turns providing it" (ibid: 551). This is additionally interesting because of the social reference to the sharing of food and cooking vessel use between families and presumably households.

James Oglethorpe remarks that among the Coweta of West Georgia in the late 1730's they "dress their meat in large pans made of Earth and not much unlike our Beehives in England" (ibid: 551). James Adair, later in the 18th century, adds that among the Chickasaw (presumably) - "They make earthen pots of very different sizes so as to contain from two to ten gallons; large pitchers to carry water; bowls, dishes, platters, basons, and a prodigious number of other vessels of such artiquated forms, as would be tedious to describe, and impossible to name" (ibid: 553).

A very different picture is presented by Caleb Swan for the late 18th century upper Creeks. Swanton quotes him as saying that these Indians make:

> Earthen pots and pans of various sizes, from one pint up to six gallons. But in these, they betray a great want of taste and invention, they have no variety of fashion; these vessels are all without handles, and are drawn so nearly to a point at the bottom, that they will not stand alone. Therefore, whenever they are set for use, they have to be propped upon three sides with sticks or stones. (ibid: 551)

Swanton describes his own early 20th century observations from Oklahoma Muskogeans. While most of his comments are related to the technological side of vessel manufacture, he does discuss the use of corn cob roughening on the outsides of "very large pots...if they were to be used in cooking" (ibid: 552). Perhaps the roughening of cooking vessels (which is certainly common archaeologically in some areas and times in the Southeast) made heating more efficient by increasing the exterior surface area of a pot and thus increasing the area exposed to heat. Swanton describes the principal vessels made as "a flat earthen skillet...an earthen pot...an earthen dish...and, in more modern times, a frying pan..." (ibid: 553).

In summary, then, the ethnographic data from the Southeast while sparse in quantity and detail, does give some useful information in the study of ceramic vessel form and use. A variety of vessel forms were present in most areas, although the number may have decreased in historic times as metal containers replaced their ceramic counterparts in these cultures.

The records also give some indication of the size ranges for ceramic vessels made in the historic Southeast. The ranges mentioned are as small as "1 pint" (.47 liter) to as large as "10 gallons" (37.8 liters). The most common size mentioned (three references) was "40 pints" (5 gallons or 18.9 liters). One reference was to "6 gallons" (22.7 liters) and another was to "50 pints" (6.25 gallons or 23.7 liters). There is no real indication as to whether this wide range was as one large normally distributed size curve or in discreet (multi-modal) size groups within the overall range. Archaeologically, both of these situations are seen as possible for different vessel shape classes (Hally 1980b; Shapiro 1981b).

There is no indication in any of the pre-20th century literature of vessel decoration whether by stamping or incising. Archaeologically, we know that both of these were commonly used. Swanton describes seeing incising done with a turkey feather--"As she did this, the quill would burn and color the parts of the pot over which it was passing" (Swanton 1946: 552). As mentioned above, he describes the use of a corncob to modify the surfaces of cooking vessels (ibid). Some vessels surface were intentionally smoothed inside and out with a mussel shell (ibid: 551).

With this background information in mind, we are better able to look at the vessels of 9Mg28 and, by implication, those from similar sites in the Upper Oconee River drainage in Northeast Georgia. At least two problems immediately present themselves, however. First, there are no known historic documents which refer specifically to the former inhabitants of 9Mg28, or for that matter, those of the Oconee River above Milledgeville. There are therefore, no direct accounts of ceramic manufacture, use, or form variation for this site or area that can be used as direct analogies. The second problem is that the ceramics of the Upper Oconee River area at the time of occupation of 9Mg28 (the Bell Phase) are archaeologically known to differ as a group in several respects from the ceramics in other areas of the Southeast at the same time period. While this latter point is not too surprising, it helps limit the usefulness and applicability of ceramic ethnographic information derived from other areas of the Southeast. While there are no proper or apparent solutions to these problems, they are at least stated and recognized. It is believed that there is enough general similarity between the Oconee River Valley ceramics and those of East Central Alabama, for example, to allow cautious parallels to be made.

While there may be several ways to attempt the determination of the uses for ceramic vessels found on archaeological sites, the one used by most analysts is based on the notion that the use for a particular ceramic container (or any artifact for that matter) conditions or determines the form for that item. That is, form follows use. While idiosyncratic behavior is always possible, the general nature of this assumption is here accepted. Thus the first job of an analyst seeking to derive use from vessel form is to define the forms present in a collection of vessels. It must always be kept in mind, however, that any given form may have multiple uses and that any given activity (use) may be performed by artifacts of more than one form.

This is where the trouble starts. Form is a concept used to discuss the sum total of the characteristics of a given artifact, in this case, a clay pot. For any item, however simple it may appear at first glance, many human decisions were made in its production, ranging from materials used, to exact shape, to decoration. Even if form is restricted in definition to shape alone, as it often is, a large problem still remains. This stems from the fact that artifacts can be measured in an almost infinite number of ways in attempts to quantify something as ephemeral as "shape". Anyone familiar with the number of classically defined anthropometry measurements for the human skull will certainly appreciate this problem. Some archaeologists have attempted to discuss ceramic vessel shapes as complex combinations of mathematically defined geometric shapes, but this is impractical in most cases, and the results are certain unwieldly.

Barring any way to easily define given ceramic vessel forms, several alternate options are available to the archaeologist. One is to simply select a few variables or characteristics out of the full range available on a specific vessel and arbitrarily define them as "significant" vis-à-vis all of the other variables which make up the pot. On the level of sherds, this is exactly how traditional chronological "pottery types" are typically defined (Ford 1962). Characteristics typically defined as "important" for form identification of ceramic vessels are those which make the application of container terms in our language most applicable ("jar", "bowl", "plate", etc.). This type of analysis, the first of three methods to be used here, is briefly outlined and implemented in Chapter 8 following. While groupings of this sort may be used to divide a collection of ceramic vessels from an archaeological site of another culture, the results may not be the same as the way the makers and users of the vessels themselves may have looked at and classified them. It is true that through chance alone some of these vessel categories may equate with those recognized in the actual culture, but we cannot know which are valid and which are not.

The second approach to vessel analysis used here utilizes various mathematical methods lumped under the rubric "cluster analysis" to combine the vessels into groups which may be similar in use as well as form or style. Of key importance here is that many variables (46 originally) were selected to serve as input data for each vessel. These variables, while certainly not "all" that could have been thought of, do represent far more than have been used in similar studies before. The logic here is that since I can't know à priori which variables were "significant" in the native classification scheme, and to help ensure that none which were critical were left out, the large number were all included with equal weights assigned. The details of this analysis and the results are presented in Chapters 9 and 10.

The final approach utilized here was an obvious, but to my knowledge, previously untapped source of information about the ceramics of the Southeastern Indians--the linguistic information found in the many dictionaries and lexicons available for these Indians. In the past, most archaeologists, primarily because of fears over their own inadequate linguistic training, have completely avoided exploring this useful body of ethnographic information. Gaimo Anttilo, a trained linguist, points out however: "It has become clear that evidence from the material culture, archaeology, and history may be crucial in linguistic explanations (and vice versa, of course)" (Anttila 1972:329). The specific approach employed here is to use Southeastern Indian linguistic data on containers to attempt to more directly understand the native logic in vessel classification. That is, what vessel form-use groups, if any, can be inferred from the linguistic data and does this classification aid our understanding of the 9Mg28 Bell Phase ceramic vessels? This linguistic analysis is presented in Chapter 11.

Because of the very different nature of their data and methods, these three approaches may be expected to give different classifications of ceramic vessels. This doesn't mean that one is "right" or the others "wrong"; it simply shows that there are different ways any data set may be analyzed. Each method may produce insights into the nature of southeastern ceramic vessel systems and thus each may be independently successful. The relative degree of success will be assessed in summary in Chapter 12.

# CHAPTER 8

## Vessel Analysis - Intuitive Shape-Size Classes

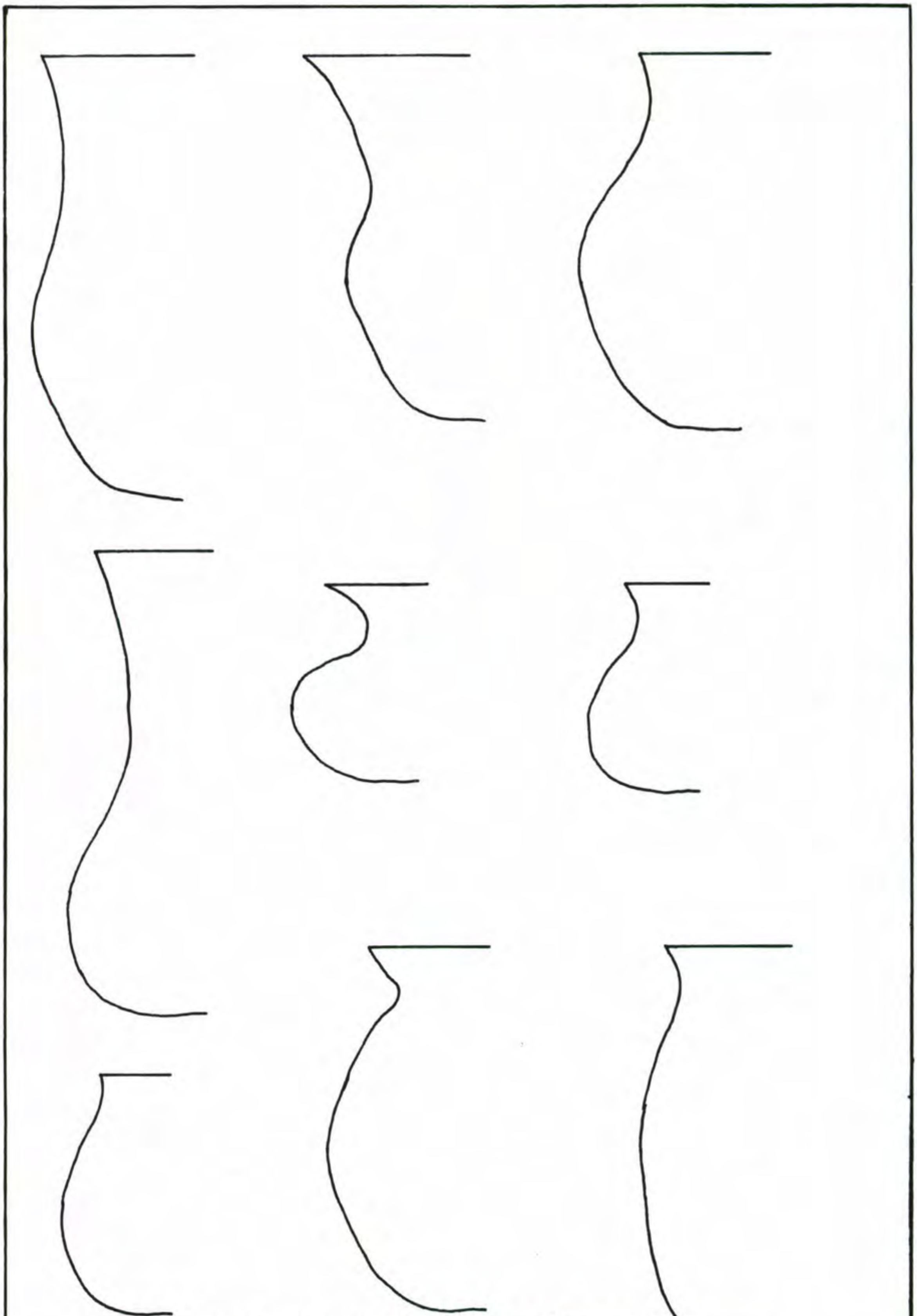
Hally has attempted to study vessel use by first classifying vessels from the Little Egypt and King sites in Northwest Georgia according to shape and size classes (1980b). His analysis uses far fewer variables for classification than the analysis presented in Chapter 9 and 10 below, but it does, however, seem to have yielded form groupings that are interpretable. Essentially, the vessels analyzed by Hally were first divided into visually apparent shape classes and second, measured and plotted by lip diameter ("interior rim diameter") as an indication of vessel size. The resulting analysis yielded six shape classes. Two of these classes had but one size class, three had two size classes, and one had three size classes. This yielded a total of 11 shape-size vessel classes. Variables of temper, texture, decoration, rim form, and lip treatment were not utilized, although some of these variables are important in the cluster analyses presented in Chapters 9 and 10 below.

It was believed that for present and future comparative purposes, an analysis similar to Hally's should also be performed on the 9Mg28 vessels, particularly since the data was already in hand and the analysis was relatively simple to perform. I should add here that there are no other ceramic vessel collections from the state (or for that matter in the Southeast) that have been analyzed through the cluster analysis techniques used in this paper that are available for comparative purposes.

In examining the vessels from 9Mg28, a total of six broad vessel shapes were defined. These six were different from the six found by Hally, however. First are jars with two points of vertical tangency (Shepard 1956:226). These are jars that have excurvate rims, but which curve back out before tapering to a base thus forming a neck and a shoulder (Figure 37). There was some variation in this shape class, but for the purpose of this analysis all were put together. Second were simple open bowls with straight (not incurvate or excurvate) rims (Figure 38). The third category used was bowls with incurvate rims--commonly called cazuellas (Figure 39). The fourth vessel shape class defined was for jars with excurvate rims. These were taller than the Class 2 open bowls (Figure 39). Class 5 contained but one vessel, a strange jar or bottle shape, restricted at the mouth and gradually enlarging toward the base, but curving back sharply to the small base at a point about one third of the height of the vessel (Figure 40). Class 6 is also unique to the site. The two vessels of this shape are spherical bowls with the small mouth about the same size as the flat base (Figure 40).

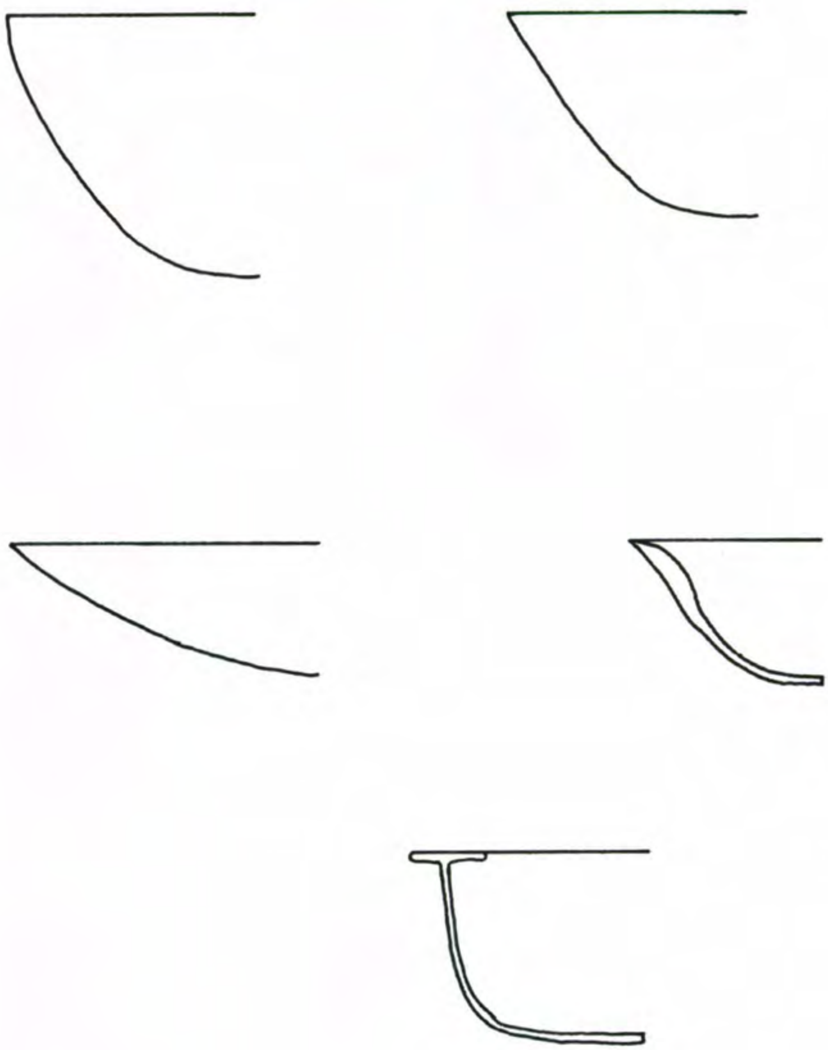
The first four of these classes could all have sub-classes of shape set up within them, but this is perhaps to be expected in coil formed hand made pots. Once these six classes were defined, the lip diameter for each vessel within each class was recorded. This data is recorded in histogram form for the first 4 classes in Figures 41 and 42.

Class 1 has no more than two vessels of any given size, the range of which is between 14 and 43 cm in lip diameter (Figure 41). These



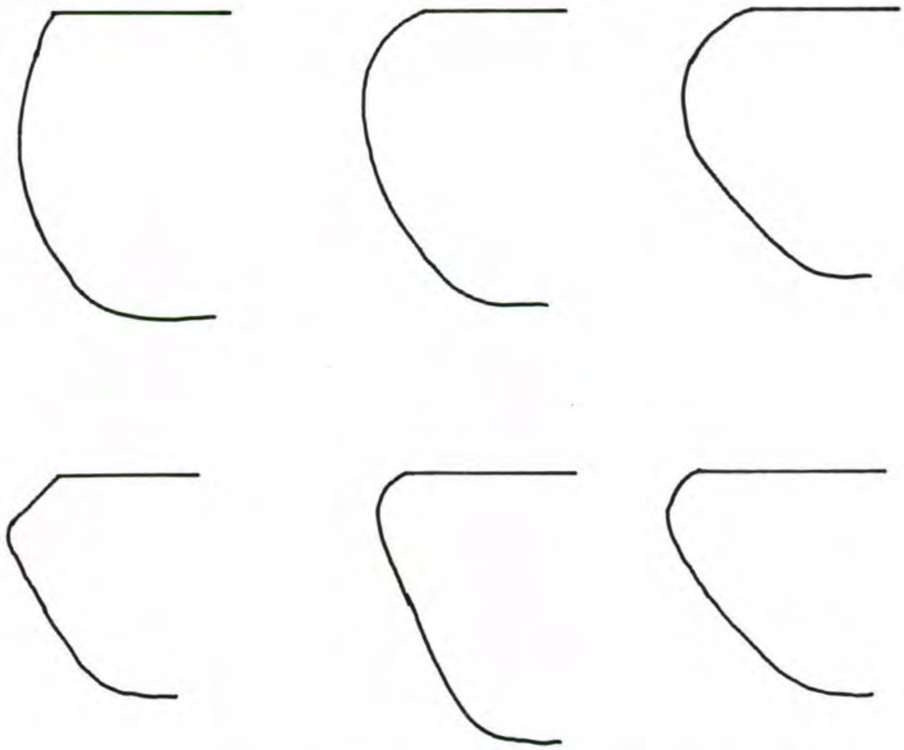
CLASS A VESSEL PROFILES

Figure 37



CLASS B VESSEL PROFILES

Figure 38



CLASS C VESSEL PROFILES

CLASS D VESSEL PROFILES

Figure 39

CLASS E VESSEL PROFILE

CLASS F VESSEL PROFILE

Figure 40

vessels do occur in size groups within this range, although the numbers are very small. The gaps between the groups are larger than the groups so these may well represent size classes. The smallest of these contains five vessels in the range of 10-16 cm lip diameter and the second contains but two vessels in the 22-24 cm diameter. The third is more difficult to distinguish as there is a small gap within. It seems best to put these together with a range of from 29 to 36 cm. This size group contains seven vessels. The final size group for this class contains three vessels in the 42-43 cm diameter range. The wide range and low numbers of vessels makes this entire class size categories uncertain, however. Perhaps all should be included as one large size group. The fact that there is no hint of a statistically "normal" distribution over the entire range argues for the use of the multiple size classes I have outlined above.

The Class 2 vessels have but one size category that is close to normally distributed and centered at 35 cm lip diameter (Figure 41). The range for these 16 simple open bowls is 26 to 42 cm. The peak seems to be slightly skewed to the low end side of 35 cm, but this seems to be a minor, perhaps random variation.

Class 3 vessels are grouped into three size classes. These incurved rim bowls are first divided into a group of but three vessels which are quite small. The range is from 10 to 16 cm for these little vessels. The other two size categories are overlapping normally distributed curves with respective centers of 30 and 37 cm. It seems unusual that there should be two separate size classes so close together, but it would seem that this is the case. Size group two contains 22 (or 23) vessels and size Class 3 contains 11 (or 12) vessels. One vessel

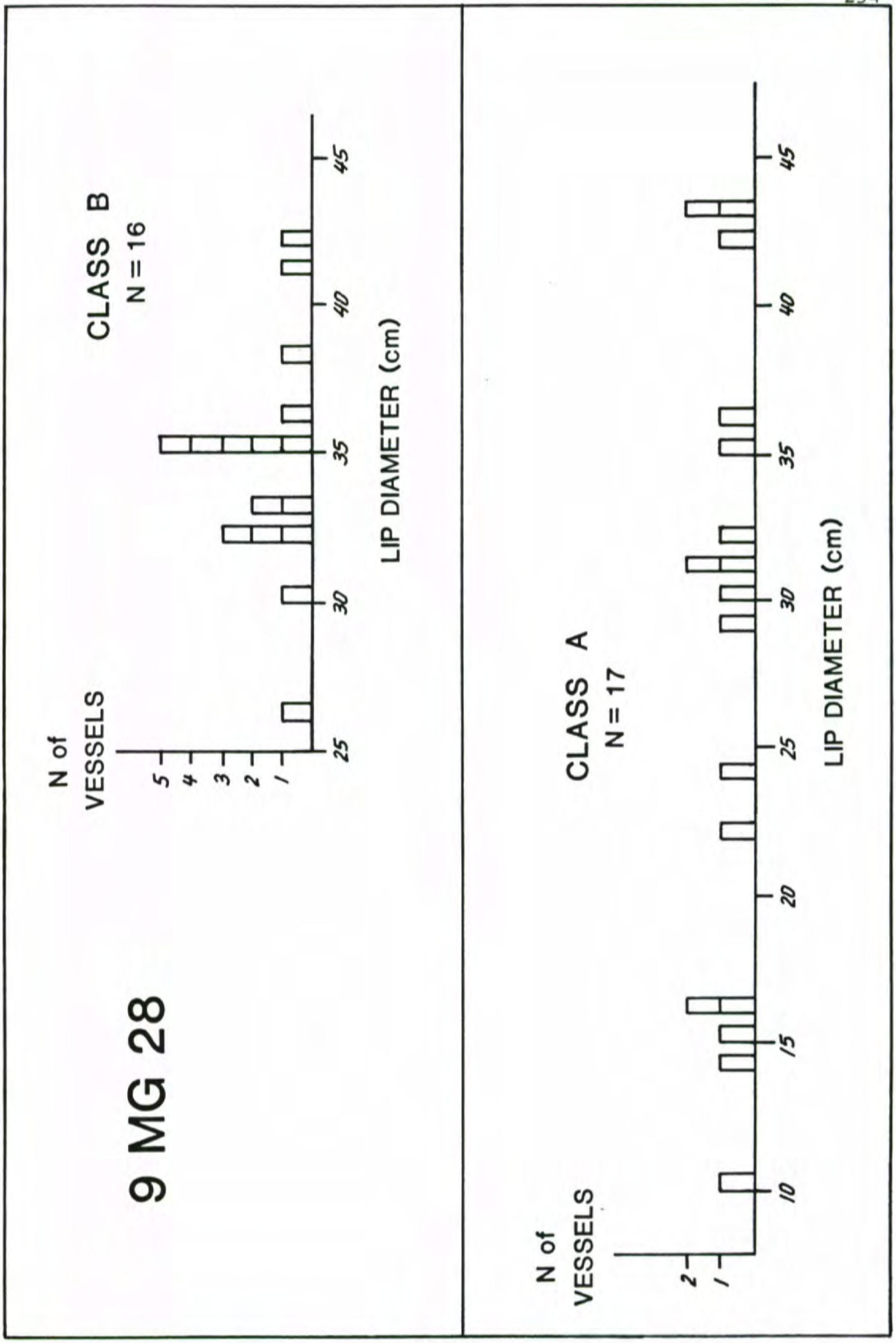

9 MG 28
CLASS B
N = 16
N of VESSELS
5
4
3
2
1
25
30
35
40
45
LIP DIAMETER (cm)
CLASS A
N = 17
N of VESSELS
2
1
10
15
20
25
30
35
40
45
LIP DIAMETER (cm)

Figure 41

at 34 cm lip diameter represents the overlap point of these two size groups.

The fourth class of vessels are excurvate rim jars. Only one size class is represented by these vessels. This is centered at the 30 cm lip diameter, the same as the second size group of Class 3. The range for these vessels is from 22 to 39 cm and a total of 24 vessels are represented (Figure 42). They appear to be approximately statistically normally distributed, but the tails of the curve are a little extended.

Class 5 has but one vessel with a lip diameter of 11 cm, and Class 6 has but two vessels with lip diameters of 7 and 9 cm. It is interesting that these unusual vessel forms are also both quite small. It would appear that more experimentation and variation in vessel shape was permitted on smaller vessels than on larger ones.

Depending on how close one is interpreted, the total number of shape-size categories for the 9Mg28 vessels varies from eight to eleven. This is slightly fewer than Hally demonstrated for his Northwest Georgia material and this is probably due to the tighter clustering of the 9Mg28 vessels around their particular lip diameters. It is also quite possible that the lumping of many vessels with only roughly equal shapes under Class 1 in this analysis reduced the number of classes and thus the total number of shape-size groupings.

Hally utilized the lip diameter as the single measure of vessel size based upon an assumed (and partially tested) strong correlation between them. It would be interesting in the future to produce charts based also on maximum diameter and height to see how consistent the classes are. These data, of course, are far less likely to be available for sherds or vessels that are only partially reconstructed, while lip

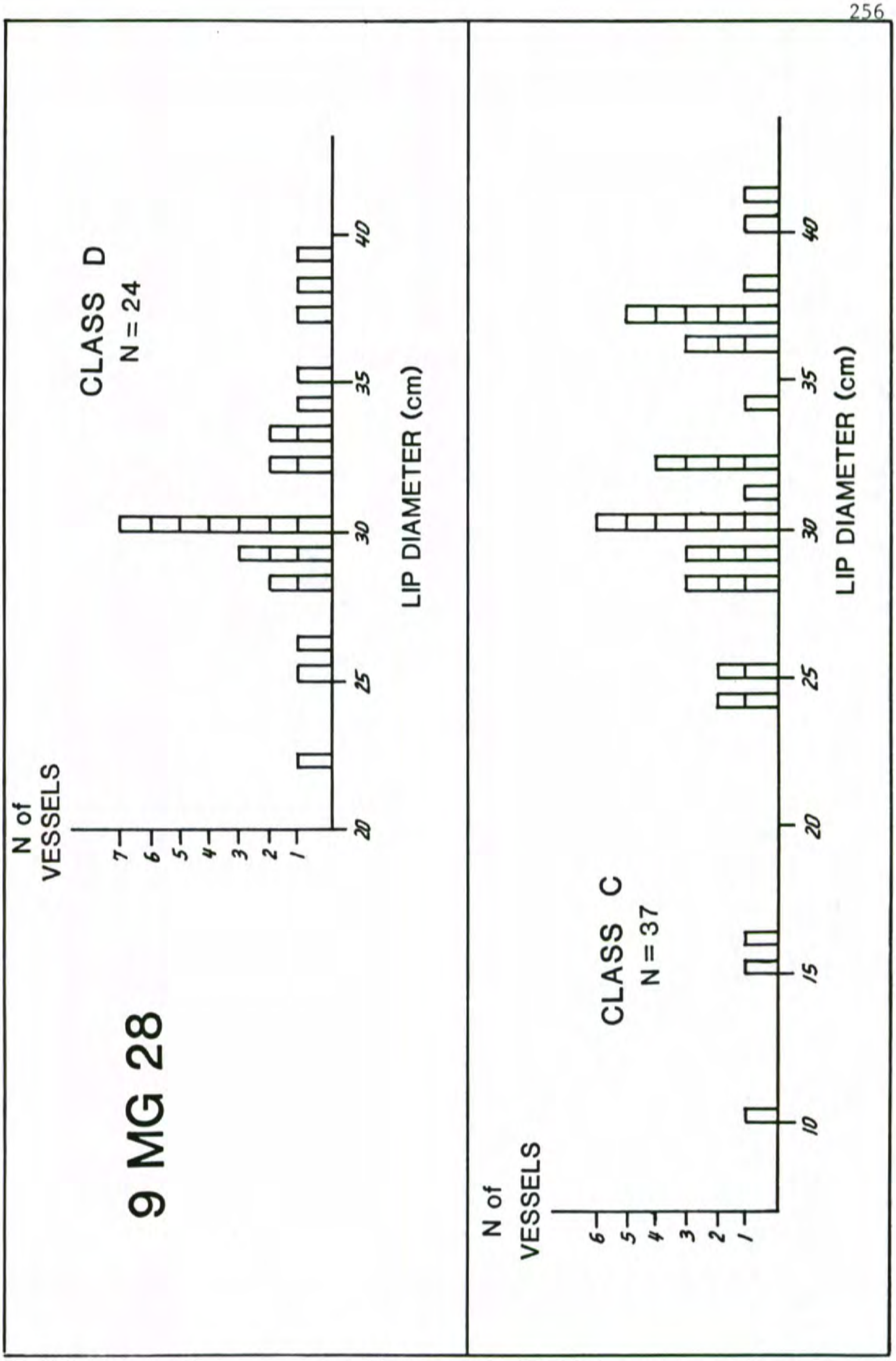

9 MG 28
CLASS D
N = 24
N of VESSELS
1
2
3
4
5
6
7
20
25
30
35
40
LIP DIAMETER (cm)
CLASS C
N = 37
N of VESSELS
1
2
3
4
5
6
10
15
20
25
30
35
40
LIP DIAMETER (cm)

Figure 42

diameter is easily obtained from a multiple curved line chart for even small rim sherds.

The primary value of the style of analysis presented here is the ease with which the results may be used to compare collections of vessels from many sites toward a greater understanding of vessel variability across space and time. The work of Gary Shapiro in progress at this time utilizes this type of analysis for materials from many other sites in the Wallace Reservoir area (Shapiro, personal communication). Whether the patterns produced by this intuitive classification scheme are ultimately adequate to the task of defining vessel use categories remains to be seen.

CHAPTER 9

Vessel Analysis - Computer Methodology

This section describes in detail the steps utilized in the computer classification of the ceramic vessels from 9Mg28. At many different points in the process decisions had to be made about the best way to proceed. While every effort was taken to make reasonable decisions, different results may have been generated if those decisions had been different. Ideally, all possible choices should have been made and explored to the end, but this would have resulted literally in thousands of possible solutions. That the analysis did yield reasonable solutions, however, implies that reasonable decisions were made in the process and the exploration of all possible solutions would have been superfluous.

Since only one of the 118 vessel numbers assigned for 9Mg28 belonged to an unbroken vessel, the first, and probably most time-consuming step, was that of reconstructing the vessels. In features with relatively few ceramic remains this was not too difficult, but in those with large quantities the task was enormous. Feature 1, the probable Busk ceremonial pit, was the most difficult. While many fragments were shattered in place and thus were segregated in the field to facilitate later reconstruction, many were not. Well over a year's part-time work was necessary to exhaust all possible fits to the 62 numbered fragments from this feature. As would be expected, the incised and rim sherds were relatively easily assigned to their proper vessel, but since less than half of the vessels were incised and less than one third of the surface of the average incised vessel was incised, the majority of the pottery was plain surfaced and thus far more difficult to assign to a particular vessel under reconstruction. Thus color, temper, inner and outer surface texture, degree of curvature, fire clouding, and other variables, including luck, became critical in the reconstruction process for all the plain sherds. This work was exclusively carried out by Marshall Williams and the author for Feature 1 and Feature 2, while the author with occasional help from Tom Mayes and Susan Wolf reconstructed the vessels from the remaining features. Typical vessels are shown in Figure 43.

An initial list of 46 variables was compiled for use in the analysis of the vessels. These are listed in Appendix C and discussed below individually. It should be pointed out that ultimately not all of the variables here outlined were used in the computer analysis. Those not used are noted below and the reasons why not are discussed.

The first variable dealt with the feature from which each vessel was recovered. A total of seven features (numbers 1, 2, 5, 12, 15, 18, and 19) formed the universe of features with reconstructable vessels from 9Mg28. For descriptions of these features see Chapters 4 and 5. These were arranged in terms of the amount (in the form of sherd counts) of pottery present from most to least. Thus a vessel from Feature 1 was coded with a 1, Feature 5 and 2, etc.

Variable 2, representing the proportion of each vessel present after all the possible reconstruction was performed was expressed simply as a percent. These are visual estimates done by the author and were usually estimated to the nearest 5%. A few unique rim sherds were

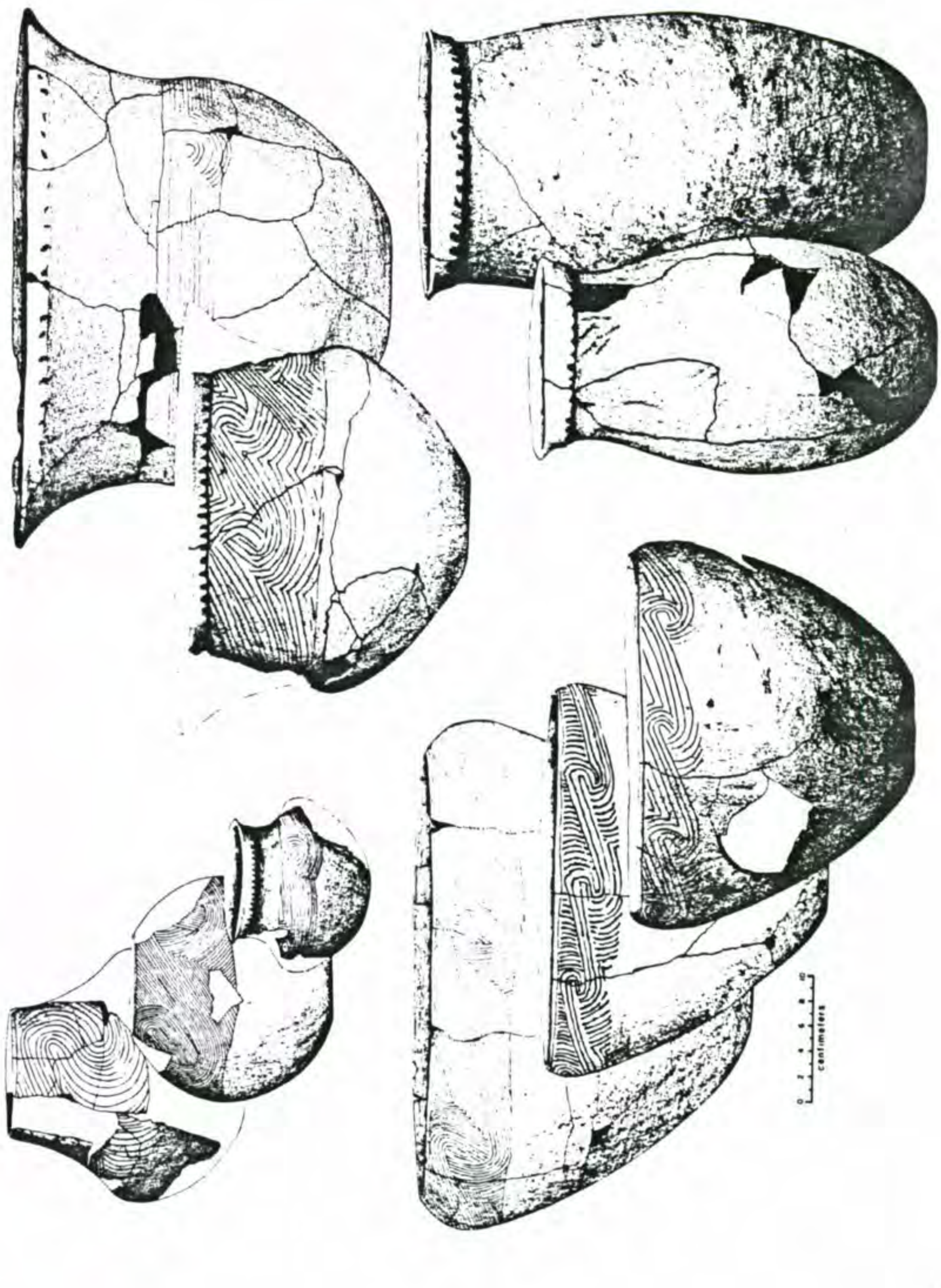


Figure 43

included and were recorded as 1%. The inclusion of these has been generally vindicated by the generally correct distribution of these to the appropriate category by the analysis. This variable assumes that little pottery was lost from each feature prior to excavation; half a vessel represents a discarded half vessel and not just half of a whole discarded vessel. The highest percentage recorded was 99.5% (Vessel 4), the only intact vessel. It had a few chips out of the rim area, apparently from use, and thus was not 100% present. The mean for 115 vessels analyzed was 33.34% with a large standard deviation of 30.86%. The coefficient of variation was thus a very large .93. The 95% confidence interval was from 27.6 to 39.04%. This means that there was a .95 probability that any pot chosen at random would be in that range.

Variable 3 represented the maximum height (in centimeters) for each vessel. Vessels that were intact top to bottom were measured directly. Vessels that were relatively complete but lacked a bottom were held in the air to a height deemed visually correct and the estimated height recorded. This is justified on the basis of the experience of the author with the whole pots from the site and reasonable confidence is placed in the estimates. A total of 70 vessels had data on height recorded. The mean for all these was 22.92 centimeters (standard deviation of 7.61 centimeters). Thus the V was a moderate .33. The range was from 7.4 centimeters to 47.0 centimeters. The 95% confidence interval was from 21.11 to 24.7 centimeters.

Variable 4 was the lip diameter, i.e. the diameter at the very top edge of the vessel. Most vessels were quite symmetrical in diameter. Where there were slight differences in diameter a mean was determined and recorded. Many vessels of course were not sufficiently complete to allow direct measurement of this figure and thus a standard chart of multiple curved lines for which the diameter of each curved line was known was used. A given rim sherd or pot fragment was matched to its appropriate curve on the chart by placing the sherd over the curves and the appropriate diameter for that curve then being read from the chart directly. Using these two methods data was obtained for 103 vessels. The mean for these was 29.80 centimeters with a standard deviation of 8.1 centimeters. The value of V for these figures is thus .27. The minimum diameter recorded was 7 centimeters and the maximum was a very large 44 centimeters. The 95% confidence interval was from 28.22 to 31.38 centimeters.

Variable 5 was the maximum diameter of the vessel. For open bowls and excurvate rim jars this figure is, of course, equal to the lip diameter just discussed. For incurved rim bowls and some jars however, this figure was larger than the lip diameter. For partial vessels the maximum diameter was often determined from a chart of curves in the same way many lip diameters discussed above were determined. Data was obtained on 89 vessels all together. The mean for these was 32.28 centimeters with a standard deviation of 8.44 centimeters and a coefficient of variation of .26. The range of maximum diameters was from 12 to 53 centimeters. The 95% confidence interval was from 30.8 to 34.06 centimeters.

Variable 6 determined the location on the vertical axis of a vessel of the point of maximum diameter. This was arbitrarily done in reference to the plane of the top of the vessel, thus a vessel which had its maximum diameter at the lip would have a value of 0.0 centimeters recorded for this variable. If the point of maximum diameter was 10 centimeters below the lip that value would be recorded here. A total of

29 vessels had their maximum diameter located at the lip and 43 vessels had maximums at some point below the lip. Of these latter ones the mean difference between the lip and the point of maximum diameter was 5.54 centimeters with a standard deviation of 5.32. The large coefficient of variation was thus .96. The range of this variable was from 1.0 centimeter to 20.5 centimeters. It was not possible to determine this value for many incomplete vessels. The 95% confidence interval was from 2.15 to 4.46 centimeters.

Variable 7 recorded the neck diameter for those vessels that had points of minimum diameter between the lip and the point of increased diameter (the shoulder) below the lip for jar form vessels. Only 19 vessels had recordable neck diameters and the mean of these was 25.37 centimeters. The standard deviation was 9.03 centimeters and the coefficient of variation was .36. The minimum was 11.4 centimeters and the maximum was 40.2 centimeters. The 95% confidence interval was from 21.02 to 29.73 centimeters.

Variable 8 recorded the location of the minimum diameter of the neck (Variable 7 just discussed) with reference to the plane of the lip of the vessel in the same way Variable 6 recorded the location of the point of maximum vessel diameter. The mean distance between the lip and the neck for the 19 vessels for which this was recorded was 4.50 centimeters with a standard deviation of 3.33 centimeters. This yields a V of .74. The minimum distance was 1.0 centimeters and the maximum was 12.0 centimeters. The 95% confidence interval was from 2.89 to 6.10 centimeters.

Variable 9 represents shoulder diameter for those vessels in which the shoulder is not the maximum diameter of the vessel. This occurred on those vessels in which the lip diameter on jar form vessels was greater than the shoulder. The mean diameter for those 22 vessels on which this could be measured or estimated was 31.75 centimeters. The standard deviation was 8.58 and the V was a fairly low .27. The minimum shoulder diameter was 15.0 centimeters and the maximum was 46.0 centimeters. It should be pointed out that the term "shoulder" for measurement purposes in connection with this variable does not include the "shoulder" on jars in which that point is the maximum diameter of the vessel nor does it apply to bowls. The 95% confidence interval was from 27.94 to 35.55 centimeters.

Variable 10 records the vertical location of the previous variable again with respect to the plane of the lip of the vessel in the same manner Variables 6 and 8 record the locations of Variables 5 and 7 respectively. For 20 vessels the mean distance was 8.33 centimeters with a standard deviation of 5.21 centimeters. The resulting V was a fairly large .63 while the minimum distance was 2.5 centimeters and the maximum was 16.5 centimeters. The 95% confidence interval was from 5.89 to 10.76 centimeters.

Variable 11 is the diameter of the bottom of each vessel. Virtually all of the vessels from 9Mg28 had flat bottoms. The measuring of the diameters of these flat bottoms was slightly subjective because of the curvature from the flat bottoms to the walls of the vessels. Generally this curve was very short as a fairly sharp turn was the norm. Most diameters included a small portion of this angle or curve in their measurement. All measurements were done by the author and thus the subjectivity in measurement was fairly consistent. Many vessels fragments lacked bottoms and some had such small portions present it was not possible to estimate the diameter. A total of but 30 vessels had bottom diameters recorded. These averaged 8.64 centimeters in diameter with a standard deviation of but 1.92 centimeters. These figures yield a low V of .22 implying that the bottom diameters were probably more consistent across the collection than was vessel size itself. The minimum diameter was 4.5 centimeters and the maximum was 12.0 centimeters. The 95% confidence interval was from 7.92 to 9.36 centimeters.

Variable 12 was the vessel volume. It was not used in the computer analysis, primarily because data on this variable was not obtained from enough vessels. Volumes were obtained for 17 vessels using styrofoam pellets. It was, of course, impossible to obtain volumes using this technique for badly incomplete vessels. The mean volume for these 17 vessels (all from Feature 1) was 10,344 cubic centimeters (2.7 gallons). The standard deviation was 6423.6 and thus the V was .62. The minimum was 400 cubic centimeters (13.5 ounces or .42 quarts) and the maximum was 20,950 cubic centimeters (5.5 gallons). The loss of volume information was not considered crucial to the computer project because the height and diameter figures recorded above as Variables 3 and 5 are another measure of the volume.

Variable 13 through 15 were also not used in the computer analysis. All of these variables related to vessel wall thickness. Variable 13 was the thickness of the vessels at the rim, Variable 14 was the thickness at the side of the vessel at mid-height, and Variable 15 recorded the thickness of the vessels at their bases. All measurements were in millimeters. The mean for Variable 13 was 6.33 millimeters on 9 measurements. Standard deviation was 1.32 and V was .21. The minimum was 4 and the maximum was 8 millimeters. Variable 14's mean was 6.56

millimeters, just slightly larger than the previous variable. The standard deviation for Variable 14 was 1.88 and the V was .29. Its minimum was 4 millimeters and the maximum was 10 millimeters again on a sample size of but 9 specimens. Finally Variable 15 had only five values recorded which yielded a mean of 8.80 millimeters and a standard deviation of 1.92. The coefficient of variation (V) was thus .22. The minimum bottom thickness was 6 and the maximum was 11. These three variables were not completed primarily due to time limitations--many vessels would have required the drilling of small holes to measure the thicknesses and this was not done. In general, thickness appears related to vessel size, but the correlation is certainly not perfect. Some very large vessels had fairly thin walls. The figures show no real difference between the rim thickness and mid-height thickness, although vessel base thickness (Variable 15) is, logically enough, somewhat thicker.

Variables 16 and 17 dealt with the temper of these vessels. All vessels from 9Mg28 were grit tempered. Variable 16 delineated the amount of temper using a subjective visual measure on freshly cracked surfaces. Initially three categories were used: (1) little temper, (2) moderate amount of temper, and (3) considerable temper added. It was felt that these three categories could be reasonably judged and this was implemented rather than some arbitrarily objective system which would have taken a much longer time to implement and record the resulting data. With experience it was possible to estimate those cases between the three major categories mentioned above. These estimates were recorded as 1.5 (between little and moderate) and 2.5 (between moderate and considerable) thus producing a five step subjective classification. It was assumed that the amount of temper observed at any place in the body of a vessel was representative of the paste of the whole vessel and, this in fact appears to be true. Data was recorded in this manner for 114 vessels. Counts and percentages by category are as follows. For a code of 1.0 (little) there were 25 vessels forming 21.9% of the vessels. Code 1.5 had 17 vessels accounting for 14.9% of the collection. For Code 2.0 (moderate) a total of 28 vessels were recorded making up 33.3% of the collection, the largest single proportion for any one category. Code 2.5 had but 11 vessels recorded (9.6%) while Code 3.0 (considerable) had 23 vessels forming 20.2% of the collection. The mean of all the 114 vessels recorded was 1.96 mathematically or almost exactly 2.0-the moderate class. If the 1.5 and 2.5 categories are eliminated the curve of frequencies from 1.0 to 3.0 is almost a perfect normal curve. The categories of 1.5 and 2.5 have fewer vessels assigned to them than the three major categories and, in retrospect this may represent timidity on the part of the analyzer (me) to utilize these two categories. In any event it appears that the patterns at 9Mg28 had some variability in the amount of grit added to vessel paste as tempering but the norm was a moderate amount.

Variable 17 records the average size of the temper particles, the total amount of which was recorded in the previous variable. While there was occasional mixing of small and large grit particles in a single vessel, this was not common. Also an occasional small pebble would be included (perhaps accidentally?) in the paste of a few vessels. This variable, however, records the average size, in a similar subjective manner to the last variable, of the primary tempering grit. A three class system was initially used for this variable. These were (1) fine,

(2) medium, and (3) coarse. In general the first category included angular sand particles of less than 1 millimeter, medium included sand particles of 1 to 2 millimeters, and coarse was of particles over 2 millimeters. Categorizations were made by visual inspection alone, although no real difficulty was encountered. As with the previous variable the intermediate 2 categories (1.5 between "fine" and "medium" and 2.5 between "medium" and "coarse") were also used, but with a slightly different meaning. For this variable, in which there was some obvious mixing of grain sizes, 1.5 represented vessels which apparently had about an equal mixture of "fine" and "medium" size sand, while 2.5 was used for vessels which had about equal parts "medium" and "coarse" grained sand and grit. The counts and percentages of the resulting five categories used for this variable are as follows. Code 1.0 (fine grit) accounted for 39 vessels (again out of 114) for a percentage of 34.2, the largest of any other category. Code 1.5 had 20 vessels (17.5% of the total) and Code 2.0 (medium) had 27 vessels (23.7%). Code 2.5 contained 17 vessels (14.9%) and Code 3.0 (coarse grit) had the fewest of all-eleven vessels and 9.6%. The pattern here is not that of a normal distribution but favors the lower end of the scale. More vessels had fine grit than coarse grit. With the exception of the 2.0 category the size drops steadily from 1.0 to 3.0. This probably means that fine grit was the norm for temper size for these patterns. The very fact that variation from pot to pot could be recorded implies that the paste formula was not set to a completely rigid standard.

Variable 18 recorded the shape of the bottoms of the vessels. Only 2 categories were used-flat and conoidal. Of the total number of vessels reconstructed only 42 had bottoms sufficiently present to allow for judgement of this variable. Of these 35 or 83.3% were flat and thus the remaining seven (16.7%) were of a conoidal shape. Diameters of the flat bottom vessels were recorded above as Variable 11. No measurements were made of the conoidal (or rounded-pointed) bottoms.

Variable 19 recorded the amount of wear on the bottoms of the vessels. A total of 40 vessels were judged on this variable. The usual three part classification was initiated, the terms being (1) little, (2) moderate, and (3) considerable. These were judged based upon the frequency and depth of scratches on the bottoms of the vessels, the assumption being that the greater the wear the greater the use-life of the vessel. Again, as before, the two intermediate steps (1.5 and 2.5) were also used as experience was quickly gained in judging the wear. The results are as follows. Five vessels had bottoms with "little" wear (1.0) and represented 12.5% of the judged collection. Code 1.5 contained six vessels forming 15.0% of the group. Code 2.0 (moderate wear) contained twelve vessels, the largest of any of the categories, and formed 30.0% of the collection. Code 2.5 contained six vessels (15.0%) while Code 3.0 (considerable wear) contained eleven vessels forming 27.5% of the total. The pattern here is fairly clear. While there are some few vessels with but little wear (indicating that they were fairly new when disposed or broken or at least that they weren't used much) most had moderate to considerable wear. There is no comparative data available to my knowledge, however, to let us know how long a vessel must be in use to appear "considerably" worn on the bottom. Certainly this wear is a function of the use to which the vessel is placed.

Variables 20 and 21 represented the color of the exterior and interior of the vessels respectively. These variables were not used in the computer analysis. Data was recorded for the first 47 vessels from Feature 1 (Vessels 1 through 47) using the Munsell Color system. Two major reasons prevented the use of this data although it is presented in Appendix D. First, no simple way of converting the complex alpha-numerical data for colors in the Munsell system into a form easily used by the computer programs used was apparent and, perhaps more importantly, it was finally admitted that there was, in many cases, more variation on any given vessel than there was throughout all vessels. This is certainly exacerbated by the refiring of the sherds in Feature 1 (the Busk feature). In that feature many reconstructed fits on vessels are of sherds of totally different color due to refiring. Hally has recently dealt with the phenomenon of color changes in vessels upon firing and refiring (Hally 1980a). His work reinforces the conclusion that vessel color is not a useful variable to include in a project of this sort.

Variable 22 involved the presence or absence of "fire clouds", areas of fired vessel discoloration. These areas are generally oval or teardrop shaped and may be quite large over the walls of a vessel. As with several other variables a three fold system of subjective data recording was used. The three categories were (1) clouds completely absent, (2) clouds present but rare on the surface, and (3) clouds common over the entire vessel surface. As with other variables this three level categorization was augmented through the use of the two intermediate values (1.5 and 2.5). With 20-20 hindsight this would not have been done on this already too subjective variable. The 1.5 Code was used on cases where it was not clear that actual fire clouds were present, but some discoloration was present. The Code of 2.5 was used for vessels which had areas with many clouds, but also had large areas with none. For the record the results on 116 vessels for which this data was recorded was as follows. A total of nine vessels were recorded as having no clouds at all (1.0). This yields a percentage of 7.8% of the total collection. The category of 1.5 had 5 vessels assigned with a percentage of 4.3%. Code 2.0 (clouds present but rare) included 30 specimens for a percentage of 25.9 and Code 2.5 had 16 specimens accounting for 13.8% of the total. The final Code (3.0) that of clouds common had the largest number of all, 56, which formed 48.3% of all vessels. This variable is probably of questionable value based upon the recent work of Hally (1980a) discussed above and should most likely be eliminated from future research of this type.

Variables 23 and 24 involve the inner and outer surface textures of the vessels respectively. Both of these variables were subjectively analyzed in the same manner according to the following system. The three basic categories were: (1) burnished--in which definite evidence of burnish or light polish was present, (2) smoothed--in which the pottery surface was smoothed but not burnished, and (3) rough--in which no smoothing had been performed. The last category probably also included some vessels in which the surface had become rough through use, although every effort was made to pick an area of the surface (inner or outer) that best characterized the over all surface. Certainly this ignores variation in surface texture over a large area, but the addition of another variable at this point was not judged wise. The intermediate categories were again used with this variable. That is, a 1.5 was used on vessels which had some burnishing, but not over the whole surface and a 2.5 was recorded for vessels which had both smoothed and rough surfaces in about equal proportions.

For Variable 23, the inner surface texture, there were 29 vessels with burnished surfaces (1.0) forming 25.0% of the 116 vessels for which this was recorded. The 1.5 Code contained 18 vessels and accounted for 15.5% of the vessels. Smoothed surfaces (2.0) accounted for 57 vessels and 49.1% of the total, the largest single group. The 2.5 Code contained 6 vessels (5.2%) while the coarse Code (3.0) had the same number and percentage (6 and 5.2% respectively).

Variable 24 again had 116 values recorded. The burnished Code (1.0) contained 15 vessels forming 12.9% while the 1.5 Code had 10 vessels making up 8.6% of the total. Smoothed vessels (2.0) totaled 63 and formed the highest percentage of 54.3. The 2.5 Code contained 16 vessels accounting for 13.8% of the total while the coarse Code (3.0) had 12 vessels which formed 10.3% of the collection. For Variables 23 and 24 together it can be said that the inner surfaces of the vessels, on the average, were slightly better finished than the outsides, although on some vessels (9 out of 116) the reverse was true. The mean outer surface texture was 2.0 mathematically, or a "perfect smooth" surface. For the inner surfaces on 116 vessels the mean was 1.75, or slightly closer to "burnished" than the outer surfaces.

Variables 25 and 26 were not used in the analysis and the data was incompletely recorded. Both of these variables involve a crusty grey deposit present on the inside of a few vessels. Only five vessels were recorded with this material and these variables were eliminated from the computer analysis. Variable 25 simply recorded the presence (1) or absence (2) of this deposit on the inside of the vessels. Variable 26 recorded the distance between the top of the vessel (at lip) and the top level of the deposit build up, which always stopped short of the top. This fact in itself lends strength to the interpretation of the crud being deposited in a liquid matrix, as one never fills a boiling pot all the way to the top. The mean of three measurements obtained for Variable 26 was 4.5 centimeters (actual values were 3.0, 3.5, and 7.0 centimeters). Analysis of these deposits are presented in Chapter 13.

Variable 27 recorded the rim form for the vessels. Data was obtained from 105 vessels. A total of six categories were used in the analysis. It should be noted here that "rim" is a separate concept from the "lip" of a vessel, the latter representing the very tip of a vessel while the former includes any modification of the top couple of centimeters of a vessel. Code 1 represents a simple unmodified, straight rim. That is, the walls of the vessel are unmodified all the way up to the lip itself. This Code had 54 vessels forming 52.8% of the vessels. This was the most common single category. All of the rest of the categories within the variable represent modified rims in one form or another. Added together they form a total of 51 vessels forming 48.2% of the collection. Thus from the site as a whole about half of the vessels have simple rims and half have modified ones. Code 2 within this variable represents rims with an added rim strip on the outside of the top of vessel which has been pinched at regular intervals by the potter. Most of these as well as the other "folded" rims or vessels from the site are not actually folded but represent an added strip of clay. A total of 18 vessels were included in this type representing 17.1% of all vessels and 35.3% of these with modified rims. Code 3 rims are those in which an added rim strip was modified by notches, often made with a stick, rather than through the use of pinching. These "notches" were placed on the bottom edge of the added rim strip. A total of 25 vessels were recorded with this style rim. This represents 23.8% of all vessels and 49.0% of those with modified rims, making this the most common form of modified rim treatment. Code 4 represented vessels on which the rim strip was modified through the use of punctations made into the center area (usually) of the added strip. These punctations were made from solid rods (probably sticks) not hollow canes as had been common earlier in time, particularly during Duvall Phase (Smith 1981). Code 5 represented a different form of rim known as a "T" shaped rim. Two vessels had this anomalous form. The term "T" refers to the shape of the rim and vessel wall in cross-section with the vertical element representing the vessel wall and the horizontal element representing a short table-like development on top of the wall. This table or shelf is about 2 to 3 centimeters wide and has incised lines upon it. Vessels of this sort are rare, occurring, so far as is presently known, only on the upper Oconee River drainage during Bell Phase. In fact this rim form is one of the best markers for that period. Unfortunately it is rare and thus not likely to be often found in surface collections. The two vessels from 9Mg28 with this form account for 1.9% of all vessels analyzed and 3.9% of the vessels with modified rims. Code 6 represents one vessel (.95% of all vessels and 1.96% of the modified rim vessels) which had a lip modified with notches, probably made with a stick, at regular intervals around the top. This unique vessel probably represents idiosyncratic behavior and is not likely to be found at other Bell Phase sites. So far as I know it has not been recorded elsewhere on the Oconee at this time period.

Variable 28 records what is here called "rim shape". The categories are (1) incurvate--in which the rim area of a vessel curves or is bent in toward the center of the vessel, (2) straight, and (3) excurvate--in which the rim area of a vessel curves or leans outward away from the center of the valley. Data were obtained from 104 vessels for this variable. Code 1 (incurvate) contained 41 vessels representing 39.4% of the collection. Code 2 (straight--neither incurvate nor excurvate) contained 18 vessels accounting for 17.3% of the collection. Code 3 (excurvate) was by a slight margin the most common form with 45 vessels recorded representing 43.3% of the collection. In truth however, the numbers of excurvate and incurvate rim vessels were just about equal.

Variable 29 represented the shape of the lip of the vessels, that is the very top edge. Three categories were utilized for this analysis. The first of these (Code 1) was that of lips which had been intentionally flattened or squared. A total of 42 vessels had lips shaped in this manner. This represents 40.0% of the 105 vessels for which the information was available. Code 2 was for lips which were smoothly rounded. This was the most common category with 56 examples accounting for 53.3% of the collection. The final category (Code 3) was formed by seven vessels which had what is here called "pointed" lips in which the lip was formed into a sharp edge or point. These accounted for but 6.7% of the collection. It should be pointed out that some vessels had two different lip treatments on the same vessels. This was not common and it was usually no problem deciding which was the dominant form for a given vessel and it was so assigned.

Variable 30 was the rim strip width for those (49) vessels which had an added rim strip on the outside of the vessel. The modifications to this strip were discussed above with Variable 27. The mean for the 49 rim strips was 2.03 centimeters with a standard deviation of .38 centimeters. This yields a low coefficient of variation (V) of .19. The minimum value was .4 centimeters and the maximum was 2.7 centimeters. The 95% confidence interval was from 1.92 to 2.14 centimeters.

Variable 31 represented the average distance between "nodes", the places on a modified rim strip where it was pinched, notched, or punctated. To my knowledge this has not been recorded in any other study and it was desirable to investigate it for possible future comparative purposes. Data was obtained from 48 vessels for this variable. It should be noted that some variation in the distance at different places on any one pot does exist. The figure recorded for these vessels was an average of several (usually three to five) readings at different places on the vessel. The mean inter-node distance for 48 vessels was 1.13 centimeters with a standard deviation of .33 centimeters. These figures yield a V of .29. The minimum value was .50 centimeters and the maximum was 2.0 centimeters. The 95% confidence interval for this variable was from 1.03 to 1.22 centimeters.

Variable 32 simply recorded whether or not a given vessel had any incised lines on its surface. Code of 1 was used for vessels with no incising and Code 2 was used for those which did. Of the 108 vessels for which this could be determined with confidence, 56 were not incised (48.1% of the collection). Thus half the pots from the site were incised and half were plain.

The next 12 variables pertain only to incised vessels. Nothing was recorded on these variables for the plain vessels from the site. The number of vessels for which data could be recorded for each of these 12 variables varies due to incomplete reconstructions. The maximum, of course, for any variable is 52 - the number of incised vessels identified by the previous variable.

Variable 33 records the estimated percentage of the exterior surface of each incised vessel that is covered with incised lines. The mean for the 37 vessels for which this could be judged was 22.8 percent. The standard deviation associated with this was 16.2 percent. This yields a fairly large coefficient of variation of .71. The minimum percentage incised was 3% and the maximum was 80%. The 95% confidence interval was from 17.4% to 28.2%. The average 1/5 to 1/4 of the surface which was incised was near the tops of almost all vessels--in some cases beginning almost at the lip.

Variable 34 recorded the average width of the incised lines on the incised vessels. These were measured in millimeters and the recorded values represent the mean for any particular vessel. The variation on most vessels in width of incised lines was not great, however. The mean width for the 51 vessels for which this variable was recorded was 1.05 millimeters. The standard deviation was .48 millimeters yielding a moderate sized V of .46. The minimum value was .4 millimeters and the maximum was 2.5 millimeters. The 95% confidence interval was from .92 to 1.19 millimeters. The incised lines on these vessels, then, is much narrower than in the previous Dyar Phase and in other classic Lamar sites, such as the Lamar site itself and is more similar to the width of the lines on late 17th to 18th century materials found in Central Georgia.

Variable 35 recorded the distance between incised lines for a total of 49 vessels. Although there was some variation on individual vessels, the values recorded are certainly typical. For this variable the mean width was 3.28 millimeters and the standard deviation was 1.15 millimeters. This yields a coefficient of variation of .35. The minimum separation of incised lines was .5 millimeters and the maximum was 7.0 millimeters. The 95% confidence interval was from 2.95 millimeters to 3.61 millimeters.

Variable 36 was recorded with reference to what are here called "zone lines". These were single incised lines encircling a vessel and apparently used to demarcate an area of incising on a vessel. Four options were available for recording here. The first of these (Code 1) was for those incised vessels with no zone lines at all. A total of 11 vessels forming 22% of the 50 vessels for which this variable was recorded were of this type. The second option (Code 2) was the situation where a zone line was present above the area of incising but none was below. This, the most common option, was recorded for 28 vessels or 56% of those in the sample. Code 3 was for vessels with a zone line below the incised area and none above. Only one vessel was recorded of this type (forming 2% of the collection). The last option (Code 4) was for those incised vessels which had a zone line both above and below the incised area. There were ten vessels with this form amounting to 20% of the collection. All zone lines on the vessels, whether above or below the incised areas, were single zones, no multiple lines being present. The most common by almost a three to one margin was the case with lines above but not below.

Variable 37 recorded the mean width of the incised band or area on a given vessel. By width is meant the distance from the top edge of an incised zone to its bottom edge. The incised areas all completely encircled the vessels on which they were placed. A total of 34 vessels were included in this analysis. The mean for these was 5.84 centimeters with a standard deviation of 2.42 centimeters. The resulting V is a moderate .42. The minimum value recorded was 1.5 centimeters and the maximum was 11.0 centimeters. The 95% confidence interval for this width was from 4.995 to 6.68 centimeters.

Variable 38 records the mean distance from the lip of a vessel to the top of the incised zone on incised vessels. This is here called "zone height". It must be pointed out that virtually all vessels had their incised zones near the top of the vessels. The mean distance for this variable was 2.34 centimeters for the 47 vessels for which it could be recorded. The standard deviation was a large 3.30 and this yields a very large V of 1.14. The minimum value was 0.0 (the incising began at the lip itself) and the maximum was 11.5 centimeters. This distribution is skewed severely to the upper end and thus the mode (.4 centimeters) is the best measure of central tendency for this variable. Seven vessels had values of .4 centimeters and six each had values of .3 and .5 centimeters respectively. For all other values recorded, three or fewer (usually one) vessels were recorded.

Variable 39 recorded an estimate of the proportion of the overall incised design on an incised vessel that was composed of curved lines as opposed to straight lines. The decision to record the percentage of curved lines as opposed to the percentage of straight lines was arbitrary. Estimates were all subjectively made by the author to the nearest five percent. The values recorded are reasonably accurate. Data was obtained from a total of 39 vessels for this variable. The mean for all these vessels was 41.15 percent curved lines. That means that a typical vessel had 40% curved lines and thus 60% straight lines. The standard deviation was 23.53 percent. This yields a moderate V of .57. The minimum value was 0.0 percent (these vessels had all straight lines) and the maximum was 85.0%. The 95% confidence interval was from 33.53 percent curved lines to 48.78 percent curved lines. My impression is that there is a greater variation in percentage across all these vessels than from earlier Lamar period sites, but this data is not available at present from other sites.

Variable 40 recorded the number of elements or lines forming the scroll like incised designs encircling these incised vessels. There was some small variation from one part of a vessel to another and the figures recorded are the mean for each vessel. The within vessel variation was small, however. For the 43 vessels for which this data could be determined, the mean was 12.2 (12 since the number must be even, logically) lines. The standard deviation was 8.7 (8 or 9) and the resulting coefficient of variation was a large .71. The minimum number of lines was three and the maximum was 44 (this is extremely usual in all of Georgia and the adjacent area). The 95% confidence interval for this variable was from 9.53 (nine or ten) lines to 14.89 (15) lines.

Variable 41 was used to record the number of design repetitions within the incised area of a vessel around that vessels entire circumference. Virtually all designs were of the "scroll" type in which a given design is repeated and interconnected all the way around the vessel. Although it was necessary in most cases to have the complete incised area of a vessel present, it was possible to estimate this variable for a few almost complete ones. The mean number of design repetitions for this variable was 7.97 (eight) and the standard deviation was 3.29 (three). These figures yield a coefficient of variation of .41 among the 30 vessels for which this could be judged. The minimum number of repetitions around any vessel was three and the maximum was 20. The 95% confidence interval for this variable was from 6.74 (7) to 9.20 (9) repetitions. Certainly this variable would seem to have been affected to a certain degree by vessel diameter, but no correlation exists.

Variable 42 recorded what is here called design symmetry. This means whether or not, in the repetitions of a design around the circumference of a vessel, each segment or repetition is of the same size. This variable is designed to determine if the decorators of the vessels "planned ahead" in placing the designs on the vessels. For the 21 vessels in which this could be judged 14 or 66.7% were symmetrical (Code 1) and 7 or 33.3% were not symmetrical (Code 2). This shows that there was a general effort to "plan ahead", but it was not universal and thus not critical to the production of a proper vessel.

Variable 43 dealt with the phenomenon of smoothing over a design. That is, it appears that some vessels had some intentional smoothing over an incised area after the incising itself had been completed and before the vessel was fired. This may have been done to remove clay built up on the edges of incised lines following their creation, but this is uncertain. There certainly was no attempt to obliterate the designs. A three level coding system was used to record this data. Code 1 was for those vessels that had definite and distinct evidence of this smoothing. There were 22 vessels, out of the 50 for which this information was recovered, of this type. This represents 44%. Code 2 was for incised vessels on which the smoothing was slight, but present. It may have been only on one area of a given vessel. A total of ten vessels (20%) were classified as of this type. Finally, Code 3 was for those incised vessels which had no evidence for smoothing. A total of 18 vessels (36%) were included in this category. Thus almost 2/3 of all the incised vessels had some smoothing over the designs. I should note that the smoothing did not adversely effect the quality of the decoration by our standards. The smoothing implement was probably a smooth river stone, but this is uncertain. Experimental studies with microscopic analysis of smoothing marks made with various implements should be possible, however.

Variable 44 was utilized to judge the overall quality of the designs on incised vessels. The term "quality" includes both complexity of the design as well as its execution. This includes how even the spacing of parallel incised lines was and how smoothly curved lines were executed. An initial five point system of scoring was implemented in which Code 5 represented the "best" quality and Code 1 the "worst". Halves were estimated between each of these five numbers thus yielding a system of nine possible scores on the design. It should be noted that these subjectively determined values were based simply on the vessels at hand with no external reference quality. The results of the 50 vessels judged by this standard produced a close to normal statistical distribution. The mean quality for these vessel designs was 2.99 (3.0 is right in the middle). The number of vessels and percentages by category (worst to best) is as follows. Code 1.0 had two vessels for 4% while Code 1.5 had three vessels for 6%. Code 2.0 was represented by seven vessels accounting for 14% and Code 2.5 contained eight vessels forming 16% of the collection. Code 3.0 was the most common with 12 vessels forming 24% while Code 3.5 contained five vessels making 10%. Code 4.0 had eight vessels (16%), Code 4.5 had three vessels (6%), and finally, two vessels (4%) were of Code 5.0, the best of the designs. The fact that design quality is normally distributed may imply that the work of many potters is represented here.

Variable 45 and 46 are not concerned with characteristics of the vessels per se, but relate to the condition of the vessels at recovery. Variable 45 records the number of sherds present in each reconstructed vessel fragment and Variable 46 records the total weight of that fragment. This data was used in correlation studies below.

Variable 45, the number of sherds per vessel fragment, had a mean for the 116 vessels for which this was recorded of 29.46 (29 or 30) sherds. The standard deviation was large--26.28 (26) sherds. Thus the coefficient of variation was a large 1.07. The minimum number was one (a few unique rim sherds were included in the analysis) and the maximum was 158. The 95% confidence interval for the number of sherds per vessel fragment was from 19.63 (20) to 39.30 (39) sherds.

Variable 46, the weight of the vessel fragments, was recorded in grams. The mean for 116 vessel fragments was 925.57 grams with a large standard deviation of 994.39 grams. The resulting large V was 1.07. The minimum value was 14 grams (a small unique rim sherd) and the maximum was 4172 grams. The 95% confidence interval was from 742.69 to 1108.45 grams.

It is possible to estimate the weight of a vessel prior to its destruction, even when incomplete by dividing the weight of the fragment present (Variable 46) by the percentage of the vessel present (Variable 2). This calculation was performed on all vessels. The mean for all

116 vessels for this calculation was 3233.24 grams (7.13 pounds). The standard deviation was 1670.49 grams yielding a V of .52.

Likewise it was possible to estimate the number of sherds a given vessel broke into at the moment of its destruction by dividing the number of sherds in a vessel (Variable 45) by the percentage of the vessel present (Variable 2) as before. The mean number of sherds by this calculation for all vessels was 113.02 (113) sherds per vessel. The standard deviation was a large 111.54 (112) sherds, however. The resulting V was thus a large .99.

Finally, the mean weight of the sherds in a given vessel could be determined by dividing the total fragment weight for each vessel (Variable 46) by the number of sherds forming that fragment (Variable 45). This calculation was done for 116 vessels. The mean for all of these was 47.62 grams per sherd. The standard deviation was a large 43.79 grams and the large V was therefore .92.

All of the data recorded on all of these variables is presented in Appendix D. Of the 46 variables outlined above only 38 were actually used in the multi-variate analysis of the pottery vessels from 9Mg28. The variables not included were Variables 12, 13, 14, 15, 20, 21, 25, and 26. The reasons these were not included are presented by variable in the previous section. The summary statistics for the 38 variables used are presented in Appendix E.

For the 38 variables which were utilized it was necessary to examine the types of variables present in the collection and, ultimately, make them compatible for the cluster analysis to be performed (Anderberg 1973:25). For all types of variables there are but four major types- based upon their scales of measurement. These are nominal, ordinal, interval, and ratio. These four may be cross classified based upon a number of possible options for each variable. The three possible number of options are (1) continuous--variables that have an infinite number of options, (2) discreet--variables that have a limited number of options, and (3) binary--variables that have but two options.

Nominal variables have "named" options. Examples of binary nominal variables are yes-no, dead-alive, etc. Examples of discreet nominal variables are place of birth, departments of anthropology, etc. There is no such thing as a continuous nominal variable. It would require an infinite number of named options.

Ordinal variables have options that may be put into a logical sequence or order although the distances between the options may not be equal or may be unknown. Binary ordinal variables would include such options as tall-short or good-bad. Examples of discreet ordinal variables are wide-medium-narrow and large-medium-small. Anderberg gives as examples of continuous ordinal variables human judgements such as texture, brightness, or sound intensity (idid:28).

Interval and ratio variables differ in whether or not the zero reference point that they both have in common is meaningful or arbitrary. Ratio variables have a mathematically meaningful zero reference point and known distance apart from each other. All variables which can be measured such as diameters or heights are included here as continuous ratio variables. Discreet ratio variables would include countable items that are fixed whole items such as the number of children, cars, or houses where zero is a meaningful bit of information. Discreet interval variables (arbitrary zero) on the other hand would include numbers such as serial numbers. Binary interval or ratio variables are difficult to conceive of and need not concern us here. Continuous interval variables, with their arbitrary zero, are exemplified by the fahrenhite temperature scale.

This information is largely derived from Anderberg (ibid:28) and Table 8 below is modified from his table 3.1. It includes all the variable numbers including those most used in the analysis as explained above. This summarizes all of the above information on variable type. The 38 variables used for the 9Mg28 vessel analysis are of the following types based upon this information. Variable 1 is of the discreet interval type. Variables 2 through 15 are of the continuous ratio type as are Variables 26, 30, 31, 33, 34, 35, 37, 38, 39, and 46. Variables 40, 41, and 45 are of the discreet ordinal type and Variables 27, 28, 29 and 36 are discreet nominal variables. Variables 16, 17, 19-24, 43, and 44 are discreet ordinal types. Finally, Variables 18, 25, 32, and 42 are binary nominal variables. There were no variables that were of the binary ratio, meaning interval, binary ordinal, continuous interval, or continuous ordinal types.

It is necessary to convert all variables to the same scale type to permit the types of analyses to be performed here. As Anderberg puts it "Most analysis techniques assume a homogeneity of scale types, whereas real data sets often feature mixed scales. One approach to handling such problems is to choose a particular scale type and then suitably transform variables to achieve homogeneity" (ibid:30). He then gives techniques and advice on converting variables. For this project all variables have been converted to interval variables. In doing this, comments for several of the variables are necessary. Variables 2 through 11, 30, 31, 33, 34, 35, 37, 38, 39, 40, 41, 45, and 46 are

TABLE 8

Pot Variable Numbers by Type of Variable

| | Binary | Discreet | Continuous |
|---|---|---|---|
| Ratio | | 40,41,45 | 2-15,26,30,<br>31,33-35,<br>37-39,46 |
| Interval | | 1 | |
| Ordinal | | 16,17,19-24<br>43,44 | |
| Nominal | 18,25,32,<br>42 | 27,28,29,36 | |

ratio variables which can be used as interval variables by ignoring the meaningful zero information. Variable 1 is already of interval type and needs no converting.

Variables 16, 17, 19, 22, 23, 24, 43, and 44 require comment to convert them from ordinal to interval. Basically the problem here is to assure that the ordered steps are equal in size and this is so done for this project. Variables 18, 27, 28, 29, 32, 36, and 42, the nominal variables must first be converted to ordinal variables by imposing an order on them and then assuming that the orders are of equal size steps. The imposed order for these variables is as follows. Binary Variable 18, bottom shape, can be called "degree of bottom flatness"; binary Variable 32, incising present or absence, can be called "degree of incising"; and binary Variable 42, design symmetry, can be called "degree of symmetry". For the discreet nominal variables the following orders have been imposed. Variable 27, rim form, is called "degree of rim complexity"; Variable 28 rim shape, is called "degree of inward curvature"; Variable 29, lip shape, is called "degree of lip pointedness"; and Variable 36, zone lines, is called "degree of zoning". These redefinitions allow all the variables to be converted to interval by the final assumption (for practical purposes) that the intervals between the named categories thus defined are equal. Without these conversions much of the vessel data collected could not otherwise be utilized in the computer classification of the vessels.

Once all the data was gathered--a task requiring no small amount of time--it was entered onto computer coding sheets and then punched onto computer cards. A total of three cards were necessary to record the data for each pottery vessel. The sequence of columns used for these three cards are listed in Appendix F. It should be noted that a value of 9.9 was used in all cases to denote missing data. The programs were designed to ignore this number.

Prior to the cluster analysis portion of the research, descriptive statistics were compiled for the entire data set using program Frequencies in the SPSS (Statistical Package for the Social Sciences) suite of programs, (Nie, Hull, Jenkins, Steinbrenner, Bent 1975:194-202). The information of concern here obtained from this program has been presented above with the descriptions of the individual variables and need not be further mentioned here.

One additional analysis of the data was performed prior to the cluster analysis. This was a study of the correlations between the variables. The correlation coefficient, denoted by the letter r, is a commonly used statistic to judge how one variable is affected by a change in another variable. Other commonly used names for this statistic are the product-moment correlation and Pearson's r (Blalock 1972:376). The maximum value for this statistic in comparing the linear relationship between two variables is 1.0 and this represents a situation of perfect correlation. That is, when one variable increases, the other always also increases proportionately. A correlation of -1.0 occurs in situations where if one variable increases, the second variable will always decrease proportionately. A correlation of 0.0 indicates that no correlation exists. This means that it is impossible to predict what the second variable will do based upon a known change in the first. It should be noted that this statistic deals only with a linear, or straight line relationship between two variables. If a curvalinear relationship exists between two variables, Pearson's r is inappropriate. An examination of the scattergrams resulting from plotting every case on a graph with the x axis as one variable and the y as the other will visually reveal if a linear or curvalinear relationship exists. If no correlation exists between two variables, the scattergram would be one of a random distribution of points over the page. The primary purpose of any correlation study, such as this one, is to attempt to discover patterns in the data set which were unknown and to give increased objectivity to those patterns which have been previously recognized.

In order to implement the correlation study Scattergram in the SPSS package of computer programs was utilized (Nie, Hull, Jenkins, Steinbrenner, Bent 1975:293-300). Each of the 38 variables utilized was correlated with every other variable through its use. Thus a total of 673 runs were made by the computer for this job. Each run took two variables, plotted a scattergram of the two against one another, and then calculated and printed the r value as well as several other statistics. This information has been selected and distilled to the information in Appendix G.

Discussion of this data first requires a note of explanation. One of the additional statistics supplied by program Scattergram was the significance of each calculation of r. Omitted from the analysis and Appendix G were all variables pairs for which the statistical significance of the given correlations were above the .05 level.

A few comments are necessary for this table. The form is that of a lower left triangular matrix of the type commonly seen on highway maps to show distance between cities. The numbers recorded represent the correlation coefficients between the two variables that intersect at that point. Notice that all values are between -1.0 and +1.0 as was discussed above. The blanks throughout the table represent calculations which had levels of significance of greater than .05 and thus are judged not relevant here. The number of cases involved in each pair of variables with significant values of r are listed sequentially in Appendix H. The numbers vary widely because only in those situations for which both variables are present on both vessels can the r value be calculated. A total 156 values of r out of the 673 calculated by the program yielded significance values of .05 or less. This represented 23.18% of those cases. Because so many pairs of variables yielded significant values of r (156), and because of the meaning of the .05 significance level (5% chance of accepting as significant those r's which are not really significant) at least seven or eight (156 times .05) of the 156 values listed in Appendix G should not be included. There is of course, no way to know which ones to exclude and the problem is not considered a major one to the project. One could also argue that since this is a complete data set (vessels recovered) even this theoretical problem doesn't really exist.

There is no completely simple way to interpret values of r other than -1, 0, or +1--none of which occur with this data set. Certainly "high" values (positive or negative) must be taken as a "strong" correlation and "low" values may be understood to show "very weak" correlation. Middle values, say .3 to .7 are much more difficult to interpret. One way to aid interpretation of these and, indeed, the higher values also, is through the use of an additional statistic computed and printed for each pair of variables at the same time r itself was computed. This additional statistic is simply the square of the r value and is called, logically enough "r squared" ($r^2$). Blalock tells us that $r^2$ "can therefore be interpreted as the proportion of the total variation in the one variable explained by the other" (Blalock 1972:392). Thus for an r value of .7 the $r^2$ would be .49 and thus for this case, about half of the variation in one variable can be explained by the other. An r value of .8 would, of course, yield an $r^2$ of .64 and an r value of .9 yields an $r^2$ of .81. In the following analysis of the vessel correlations only those values above .7 (positive or negative) are discussed. Some of these may be of no value logically and will not be used. For values below .7 (positive or negative) no comments will normally be made.

Variable 1, vessel location (from which feature on the site), does not correlate well with anything. This would imply that no specialized vessel dump areas were present, but that vessels were randomly distributed in features. Variable 2, percent present, correlates (.790) logically enough, with Variable 38, the weight of the reconstructed fragment. The reason it is not higher must relate to the fact that vessel size varies widely. No other variables correlated with Variable 2. Variable 3, vessel height, correlates with Variable 10, distance from shoulder to lip with a value of .792. The taller the vessel, the longer the neck. Variable 4, lip diameter, correlates with two variables. The strongest of these correlations is with Variable 7 (neck diameter) where a value of .954 was obtained. The larger the neck diameter the larger the lip diameter. Thus implies that a fixed shape for jars with neckswas present, regardless of size, for the 19 vessels analyzed here. A slightly weaker correlation (.754) exists between Variable 4 and Variable 5, the maximum diameter of the vessel. That it is not higher is because the correlation between the shoulder diameter and the lip diameter is not too high (.591).

Variable 5, the maximum diameter, has high correlations with the shoulder diameter (Variable 9) and the neck diameter (Variable 7). The values are .944 and .938 respectively. This correlation is not really surprising. Variable 7, neck diameter, has a correlation of .976 with the shoulder diameter. This is the highest correlation in the entire data set. There is also, surprisingly enough, a correlation between the neck diameter and Variable 30, the rim strip width, of .742. Variable 7 also correlates with Variable 31, rim strip node distance, with a value of .737. Thus the larger the diameter of the neck (of jar form vessels), the wider the rim strip and the greater the distance on the rim strip between pinches, notches, or punctates. The strange thing here is that Variables 30 and 31 do not have a strong correlation between them, the r value being only .489.

Variable 8, the distance from the lip to the minimum diameter of the neck (of vessels with necks) correlates with Variable 10, the distance from the lip to the shoulder, with a value of .711. Thus, logically, the taller the neck, the greater the distance from shoulder to lip. Variable 8 also correlates with Variable 11, bottom diameter, with a value of .742. The only thought here is that a larger bottom may be necessary to better stabilize a jar with a tall neck so it would be too top heavy and tip over so easily. Finally, there is a high correlation (.813) between Variable 8 and Variable 38, the height of the incised zone on those nine vessels with both features. Since the incised zone occurred only on the neck for these vessels it may be stated that the width of the incised zone is determined by the space available on the neck for incising rather than some independent reason.

Variable 9, the shoulder diameter, correlates with the rim shape, Variable 28, in an inverse manner with a value of -.702. Thus the greater the shoulder diameter the more likely a vessel is to be incurved at the rim. This remains unexplained. Variable 10, the distance from the lip to the shoulder also surprisingly correlates with Variable 28, but in this case the correlation is a positive one (.702). Thus the greater the shoulder height, the more excurvate the rim. A strong correlation exists between Variable 10 and Variable 11, the bottom diameter. The value was .873. This may be explained in the same way the correlation of Variable 8 with Variable 11 was explained above in terms of vessel stability. The correlation of Variable 10 with Variable 38, zone height, yields a value of .697, just under the .7 figure used here to limit discussion. This correlation may be understood, however, in terms of the same interpretation utilized for the correlation of Variable 8 with Variable 38 discussed above.

Variable 30, the rim strip width, correlates with Variable 44, the quality of the incised decoration with a value of .722. No explanation of this seems straightforward unless it takes a greater ability to produce a wide rim strip successfully than a narrow one which doesn't seem likely. A correlation of .700 exists between Variable 37, the width of the incised zone on vessels and Variable 39, the percentage of curved lines in an incised design. Thus designs with more curved lines tend to be wider. No simple explanation for this pattern is apnarent. A marginal correlation of .695 exists between Variable 37 and Variable 33, the percentage of the vessel that was incised. This appears to be a very logical correlation. The last high correlation to be discussed is that of an r value of .802 for the correlation between Variable 46, vessel fragment weight, and Variable 45, the number of sherds in a fragment.

Of perhaps as much interest as the high correlations are those variables with which no or but low correlations were evident. Variable 1, vessel location, has already been mentioned and discussed. Variable 6, the distance between the lip and the point of maximum diameter for vessels, does not correlate with anything. This is actually quite a surprise given the correlation of neck, height, shoulder height, etc. Variables 16 and 17, temper amount and temper size also do not correlate with anything (the correlation with each other was .606--i.e. moderate at best). This may mean that the formula for vessel paste was used for vessels regardless of what form they were to be. However, see the discussion below under the analysis of the form variables with complete linkage analysis.

No large correlations were present for either bottom shape (Variable 18) or bottom wear (Variable 19). The former must imply that the shape of the bottom was a decision made without regard to other characteristics of the vessel being made. The latter indicates that vessels were used or not used regardless of their form. No particular vessels (based upon those variables) was used more or less than others.

No strong correlations with Variable 22, the presence and frequency of fire clouds or vessel surfaces exists. Hally's recent work (1980a) has shown, among other things, that fire clouds may be produced directly in the firing of a vessel. On the other hand, many of the broken vessels, primarily those from Feature 1, were disposed of in fire and thus the vessel surface colors were further modified. Given these problems, it is not too surprising that this variable, originally conceived of as a way to identify vessels used in fires, did not correlate well with other variables. The presence of small quantities of baked on soot on some vessel surfaces which Hally (ibid) has shown to be a good indicator of vessel use in a fire, was unfortunately not recorded for the 9Mg28 vessels.

It is also surprising that there was essentially no correlation between Variables 23 and 24, the inner and outer vessel surface texture, and any other variables. Indeed they do not even correlate strongly with each other. The only correlation between either of these two variables and any other variable at a level of .5 or greater is a negative .554 correlation between Variable 24, outer texture, and Variable 44, decoration quality. This means that the greater the decoration quality the coarser the outer surface texture, an unanticipated result. The correlation is not strong however. All in all, we must conclude that there is no real relationship between a vessel's inner and outer texture and the rest of its form.

Variable 27, rim form (incurvate, straight, or excurvate) does not correlate strongly with any other variable. There is a weak to moderate correlation between it and Variable 28, rim shape (simple to complex). The value of .577 implies that excurvate rims tend to be more complex, i.e. folded, and that incurvate rims tend to be simple, plain rims, but, again, the correlation is not high. Lip shape, Variable 29, does not correlate strongly or even moderately with any other variable. Whether the lip was rounded, pointed, or square, seems to have been an independent variable cross cutting all vessel forms.

Variable 32, whether a vessel is incised or plain, surprisingly, does not correlate with any other variable (except for a meaningless--.066 correlation with Variable 38, zone height--there could be no zone if the vessel was unincised). The lack of any meaningful correlation of which vessel forms are incised and which aren't is disappointing but enlightening. In earlier Lamar Phases there certainly was a correlation (albeit visually and subjectively recognized) between vessel form and the presence or absence of incising. The lack of this correlation in Bell Phase may be taken as one of the defining characteristics of that ceramic phase.

There are no correlations for this collection of vessels between Variable 34, incised line width and Variable 35, distance between incised lines, or with any of the other variables. These variables thus are independent within this time period. In earlier Lamar phases (Dyar Phase for instance) the incised lines were wider than in Bell Phase, but whether the width within earlier periods varies with other vessel form variables is unknown.

Although Variable 36, the number of zone lines on incised vessels, has no strong correlations with any variable, moderate correlations are present with Variable 7 (neck diameter) (-.675), Variable 30 (rim strip width) (-.660), and Variable 40 (number of scroll elements) (.628). The latter of these means that the greater the number of incised lines on a design, the greater the number of zone lines. In other words, both go together in the production of more elaborate designs. Variable 40 itself has no strong correlations with other variables, but, in addition to the moderate one just discussed, it also has a correlation of .609 with Variable 44, decoration quality. It is possible that this reveals a prejudice on the part of the author in assigning higher decoration quality figures to those incised vessels with greater numbers of lines, but the moderate level of correlation coupled with an earnest attempt to view several different design characteristics in assigning quality figures for Variable 44 particularly makes this less than certain.

There are no strong or moderate correlations between Variable 41, the number of design repetitions around the circumference of a vessel, and any other variable. The lack of correlation even with the diameter (and thus circumference) of the vessels implies that the size of an individual scroll had nothing to do with vessel size, a most surprising result. This number is thus an independent variable based upon some unknown logic.

Variable 42, design symmetry, (whether or not all incised scrolls around a vessel are of equal width) correlates with no variables except for a curious moderate (.610) correlation with Variable 10, the distance from the lip to the shoulder of those vessels with shoulders. This correlation is not understood.

The only possible correlations with Variable 43, the degree of smoothing over the incised designs, were moderate ones of .670 with Variable 7, neck diameter, and .640 with Variable 10 (shoulder height). The former of these means that the greater the neck diameter, the greater the degree of smoothing over incised designs. Since the designs are universally on the necks of those necked vessels with incising these variables may be more closely related than one would think initially. Exactly why this correlation, albeit moderate, is present is unknown however. Likewise no reason for the Variable 43--Variable 10 moderate correlation is here posited.

Following the completion of the correlation study the next major step in the analysis procedure was that of performing the cluster analysis, attempting to group the vessels into similar groups based upon their characteristics in the form of the variables discussed above. In order to perform the cluster analysis a number of decisions had to be made and steps performed in a sequential manner.

Initially it must be explained why the techniques of cluster analysis are utilized in this study as opposed to any other available multivariate statistics. In addition to the fact that the output from a typical cluster analysis is visually and intuitively appealing in comparison to other techniques, the following quote from Anderberg is important:

> In cluster analysis little or nothing is known about the category structure. All that is available is a collection of observations whose category memberships are unknown. The operational objective in this case is to discover a category structure which fits the observations. The problem is frequently stated as one of finding the 'natural groups'. In a more concrete sense, the objective is to sort the observations into groups such that the degree of 'natural association' is high among members of the same group and low between members of different groups. The essence of cluster analysis might be viewed as assigning appropriate meaning to the terms 'natural group' and 'natural association' (Anderberg 1973:2-3).

The first step in performing a cluster analysis is the creation of a lower left triangular similarity matrix (such as the one in Appendix G). The computer program utilized for this procedure was a modified (by the author) version of program PRQ initially written by Dr. Donald Graybill of the University of Arizona's Laboratory of Tree Ring Research. As originally written this program, in concert with most other programs of this sort available (including the more complicated ones in Anderberg

(1973)), did not have provisions for dealing with missing data. For the 9Mg28 vessels most have one or more variables which could not be recorded. For instance, no information about the bottom wear (Variable 19) could be recorded on vessel fragments which lacked the bottom. Thus rather than drop this vessel from the analysis, it was imperative to modify the program to utilize the data for this vessel that was present in order to group the vessels. The technique adopted for this was a pair-wise deletion of variables for any two vessels for which data on a given variable was not present for either of the two vessels being compared by the program at a given step in the operation. A value of 9.9 was assigned to any missing variable for each vessel. Upon reading this value the modified program took appropriate action to ensure that this variable would not be used in calculating the similarity between pairs of vessels.

One of the advantages of Graybill's original PRQ program over most others is that it allows for the selection of a number of different techniques for determining the similarity values to be inserted into the resulting similarity matrix. After examination of these options it was decided to use the "Average Squared Distance" (Option 1) as the association measure for this project. This calculation is the sum of the squared differences between two cases (pots) for each variable divided by the number of variables on which the two pots in question were compared. Missing values, as discussed above, meant that not all variables were used for any given pair of pots to be compared. Option 2, the "Taxonomic Distance" was the square root of the above option and might have been used. Option 4 (Squared Eucledian Distance) and Option 5 (Eucledian Distance) are commonly used for projects of this sort, but were inappropriate here because they assume that the same number of variables were used on all cases (they do not divide by the number of columns). Program PRQ also standardized all the data on the variables to a zero mean with a unit standard deviation prior to creation of the similarity matrix. This is necessary to keep variables with large absolute values (diameter, etc.) from being dominant over those with small absolute values.

A further decision to be made was what groups of pottery vessels were to be clustered. The first and most obvious group consisted of using all the pots with all the variables (except those noted above). This was done as Experiment 1. It was also decided to do a cluster analysis of all the pots using just the variables of form and not decoration. These include a total of 22 variables. Those included in this, Experiment 2, are Variables 3-11, 16-19, 22-24, 27-32. This was designed to see if vessel form data alone yielded a similar clustering of vessels to those formed by clustering using all variables. The final experiment performed using cluster analysis was a clustering of just the decorated (incised) vessels and utilized only the variables of decoration themselves without any shape variables included. This is intended to cluster designs on vessels. The 12 variables included in this phase of the analysis were Variables 33-44. This analysis, of course, was performed only on the incised vessels from the site.

There are several different mathematical techniques available to perform what is broadly called cluster analysis. The most commonly used types, and the type employed here, are agglomerative methods (Anderberg 1973:131). Anderberg presents computer programs designed to implement several of these methods. A total of three different methods were utilized here for all three of the above outlined experiments or analyses. The three methods employed were Single Linkage (ibid: 137), Complete Linkage (ibid: 138), and Ward's Method (ibid: 142). The program listings used for these analyses were included in the back of Anderberg's book. Based upon his research Don Graybill (personal communication) has shown that Ward's method generally produces clusters that are most in agreement with typical archaeological classification schemes and was initially thought to be the most important for this project. The other two methods are utilized on the data to provide an independent test of Graybill's observation.

Thus all three experiments were performed using all three methods using the computer facilities at the University of Georgia. The results were in the form of nine separate dendrograms. The actual analysis procedures for the dendrograms was as follows.

The three Single Linkage dendrograms produced are of no analytical value due to the phenomenon of "chaining". This means that the resulting dendrogram produced only one large cluster that was stairstepped from one end to the other. The results cannot, therefore, be interpreted in any meaningful manner and must be eliminated from further discussion. Apparently Single Linkage cluster analysis often produces this result and thus probably is not at all usable with archaeological data. The remaining two types run, however, (Complete Linkage and Ward's method) both produced good cluster results. In fact the Complete Linkage technique produced tighter, thus "better" clusters than did Ward's method for this data. This was, as just noted, not expected.

In order to analyze these results it was first necessary to make photographs of all vessel fragments and place the vessel number on the photographs. This was done to save space, time, and wear and tear on the vessels themselves as all vessels would have had to have been set in groups on tables for inspection according to the results of a given cluster analysis dendrogram. The use of photographs (small black/white prints) facilitated the process to the point of being essential.

As with the analysis of any cluster results in the form of a dendrogram the most difficult and somewhat subjective question to answer is that of "how many clusters are present?" There is no simple way to answer this question. Although many clusters are visually apparent immediately, many are not. Ultimately the size of clusters is subjectively based upon the decisions of the interpreter. While I can not know how accurate my own divisions are objectively, at least some attempt was made to divide the various dendrograms into clusters in a similar manner. The ultimate judgement of cluster decisions is based upon the utility of the resulting groups in making sense out of a mass of data.

Following the determination of clusters for each of the six dendrograms analyzed, photographs of the vessels within each cluster were placed together on a table and carefully examined to determine the probable reasons that those vessels grouped together in a given cluster analysis. Generally this was not difficult, but was occasionally confusing at first. A few vessels obviously were out of place in given clusters and these outliers were simply eliminated from the analysis. No additional computer work was done to reassign the outliers or to reshuffle the assignments because the clusters were adequately interpretable without it. The following chapter describes the clusters recovered from the analysis for all six cluster experiments.

# CHAPTER 10

## Vessel Analysis - Cluster Results

Before discussing the individual cluster printouts in detail, a few comments are necessary. First, it should be realized that these classifications of the vessels cannot be judged as correct or incorrect. A classification should rather be judged in terms of its usefulness. The usefulness of a given classification however is often difficult to assess without some additional empirical testing. The major thrust of these classifications was to use many variables, as many as could be reasonably thought of by this author, all of which are arbitrarily of equal importance (equal weight given to all variables) in the classification. While this takes advantage of more observational data for each vessel, it created problems in the step by step analysis of the clusters. To wit, it was often difficult to determine just which variable (or variables) caused vessels to be grouped the way they were by the cluster analysis. Certainly some clusters were far more "logically" grouped than others. Of further concern is that the two analysis techniques--Complete Linkage and Ward's method--yielded different answers to the higher level grouping of the vessels, although they were gratifyingly similar at the lower level groupings of vessels. Some slightly higher credence is here given to the Complete Linkage analyses, however, as they generally produced tighter clusters.

The analyses below will be presented in the following sequence. First the analyses of the incised decorations on those vessels so decorated will be presented--first the Complete Linkage and then Ward's method. Secondly the two analyses of the form variables only for the vessels will be presented, and finally the interpretations of the two cluster charts using all the variables together will be discussed.

Decoration Variables, Complete Linkage Method

A total of twelve variables were used on a total of 50 vessels for this analysis. It should be here noted that vessel 44, an incised bowl was inadvertantly omitted from the following analysis of decorations. All of the decorations were made with incised lines, no stamping being present. The twelve variables used were (see previous chapter for more detailed descriptions of variables 33-44) as follows: 33) percentage of vessel surface decorated, 34) width of incised lines, 35) distance between incised line, 36) presence of zone lines, above only, below only, both, or neither, 37) width of decorated zone, 38) distance from lip to top of decorated zone, 39) percentage of curved (as opposed to straight) lines in a design, 40) the number of lines or elements in a design, 41) the number of design repetitions around the circumference of a vessel, 42) whether these repetitions were all of the same size or not, 43) whether there were any smoothing marks over designs, and finally, 44) the overall quality of the design, quality here reflecting not the originality of the design, but how well it was executed.

All of the designs are but simple variations on what is here called a scroll design. This consists of an area of circles or semi-circles connected by (usually) straight lines in a repeating pattern all the way around a vessel. The designs occur in bands placed (usually) near the tops of the vessels. There were no randomly placed decorative elements or designs. Attention was not drawn to the decoration per se but designs used in much the same way our eating plates have decorations around their borders. Many of the specific designs are included in Appendix I. In the following discussion the reader is urged to pay close attention to the appropriate figures, or confusion is certain to occur.

In discussing the specific Complete Linkage cluster results (Figure 44) there are two major clusters at the extreme right. The analysis shows that those vessels in the top or first cluster (all clusters described by figure in this chapter are arbitrarily numbered from top to bottom) include designs which have fewer lines or elements and those in the second cluster have a greater number of elements. As with all of these divisions, there is some overlap, but of all the variable analyzed only this one seemed to explain this split.

A three cluster solution to this problem retained the first cluster from above but split the second cluster, the one with more lines, into two separate clusters. Those in Cluster 2 were designs which were of a lower quality and those of Cluster 3 were of a higher quality.

Moving further to the left (Figure 44) with a four cluster solution, the last two clusters from the three cluster solution just discussed remain the same. Indeed they stay the same through the final six cluster solution. For the four cluster solution the top cluster of the three cluster solution divides into two separate clusters (1 and 2) and seem to have two causes. As with Clusters 2 and 3 of the three cluster solution (now Clusters 3 and 4) a division based upon design quality was present, those in Cluster 1 being of a lower quality than those in

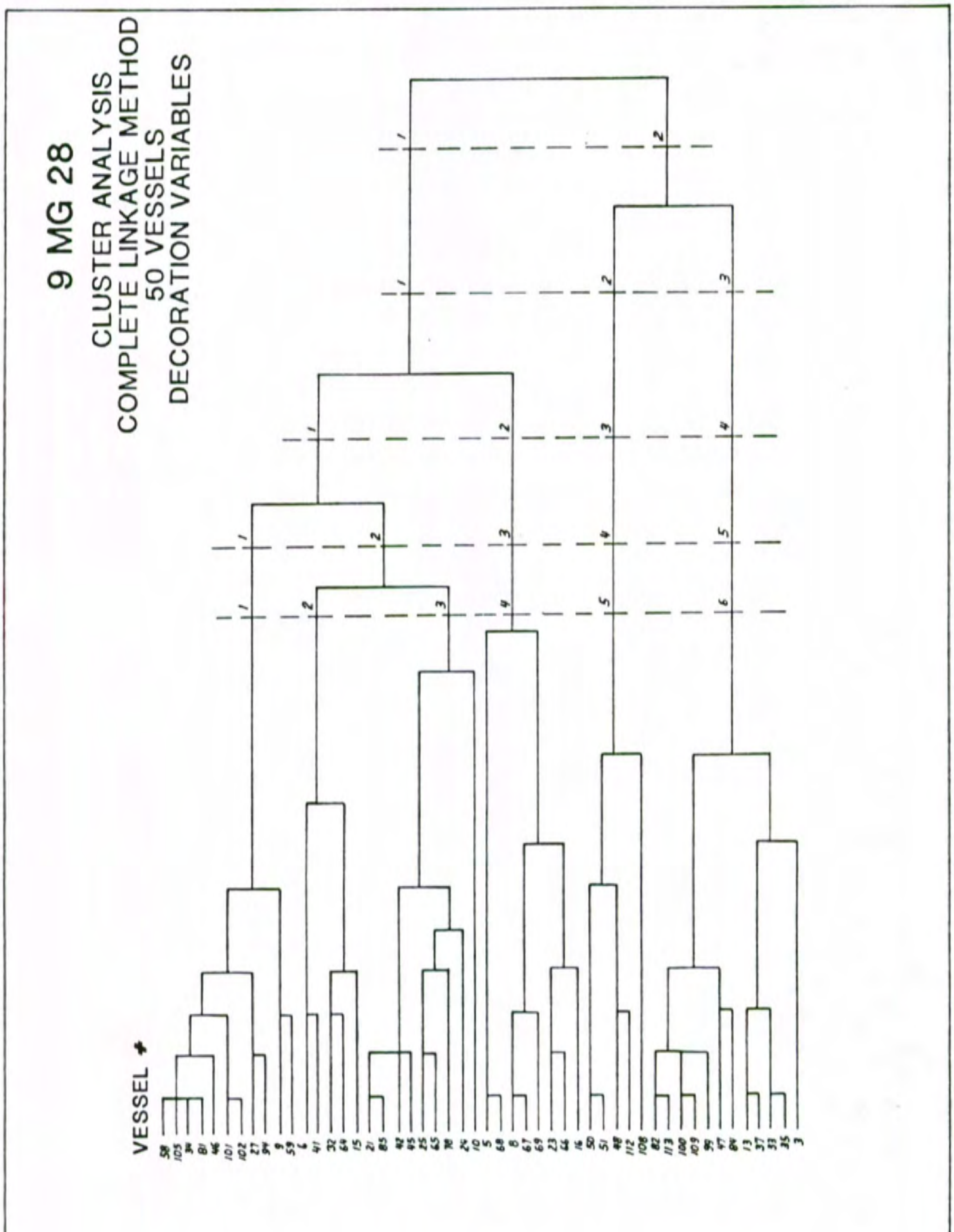

9 MG 28
CLUSTER ANALYSIS
COMPLETE LINKAGE METHOD
50 VESSELS
DECORATION VARIABLES
VESSEL #

Figure 44

Cluster 2. Additionally the designs on the vessels in Cluster 1 had a greater percentage of curved lines than did those in Cluster 2.

The next level of splitting, the five cluster solution, is the same as the four cluster solution except that Cluster 1 of the 4 cluster solution divides into two clusters. Those of the new top cluster, Cluster 1, generally have some degree of smoothing over the designs, while those in new Cluster 2 have not much if any smoothing over the designs. Further, the designs in Cluster 1 range from 30-65% in the percentage of curved lines while those in Cluster 2 range somewhat higher at 40 to 80% curved. Remember that both of these clusters, however, have a greater percentage of curved lines than Cluster 3 (Cluster 2 from the 4 cluster solution).

The final level to which I take the analysis is to the six cluster solution level. At that level Cluster 2 of the five cluster solution just discussed divide into two clusters (Clusters 2 and 3 of this six cluster solution). Cluster 2 had a large percentage of the vessel surface decorated while Cluster 3 has a smaller percentage decorated.

Beyond the six cluster solution decisions about what caused the groupings and divisions are less clear and no further divisions are presented here. It is interesting that only five of the 12 variables, all of which were given equal weight, were used to divide the designs to the six cluster level. These were, in sequence of their use in the clustering, 1) number of elements, 2) quality of decoration, 3) percentage of curved lines, 4) smoothing over the design, and 5) percentage of vessel surface decorated. Some of the other variables, such as number of design repetitions and design symmetry were often missing from data for the vessels (due to incomplete reconstructions) and it is thus not too surprising that they were not important. It is somewhat surprising, however, that the width of the incised lines, the distance between the lines, and the width of the decorated zones were not critical variables in this analysis. The importance of the number of elements in the designs may well relate to some culturally defined decision in the production of the designs, perhaps having to do with the number system of the people. It may also relate to the abilities of the individual pot makers, but these are questions to be explored in the future.

Decoration Variables, Ward's Method

The same 12 variables were used in this analysis as in the previous one. The cluster printout for this method is presented in Figure 45. From the previous complete linkage analysis a total of 15 groups of vessels (designs) grouped together at the lowest level of clustering were also present in the Ward's results. How the 15 groups of vessels were combined to form larger groups was somewhat different however. Further, the clusters for the Ward's method were not quite as easily interpreted as the Complete Linkage and also formed slightly less tight clusters. This trend continued with the other cluster results presented in this chapter also.

At the far right of Figure 45 a break into two major clusters is present. Those in Cluster 1 (the top one) tend to have fewer lines or elements and those in Cluster 2 tend to have more elements in the design. Further those in Cluster 2 are of slightly higher quality than those in Cluster 1. It is interesting that the number of elements was also the variable of most importance in the previous Complete Linkage analysis.

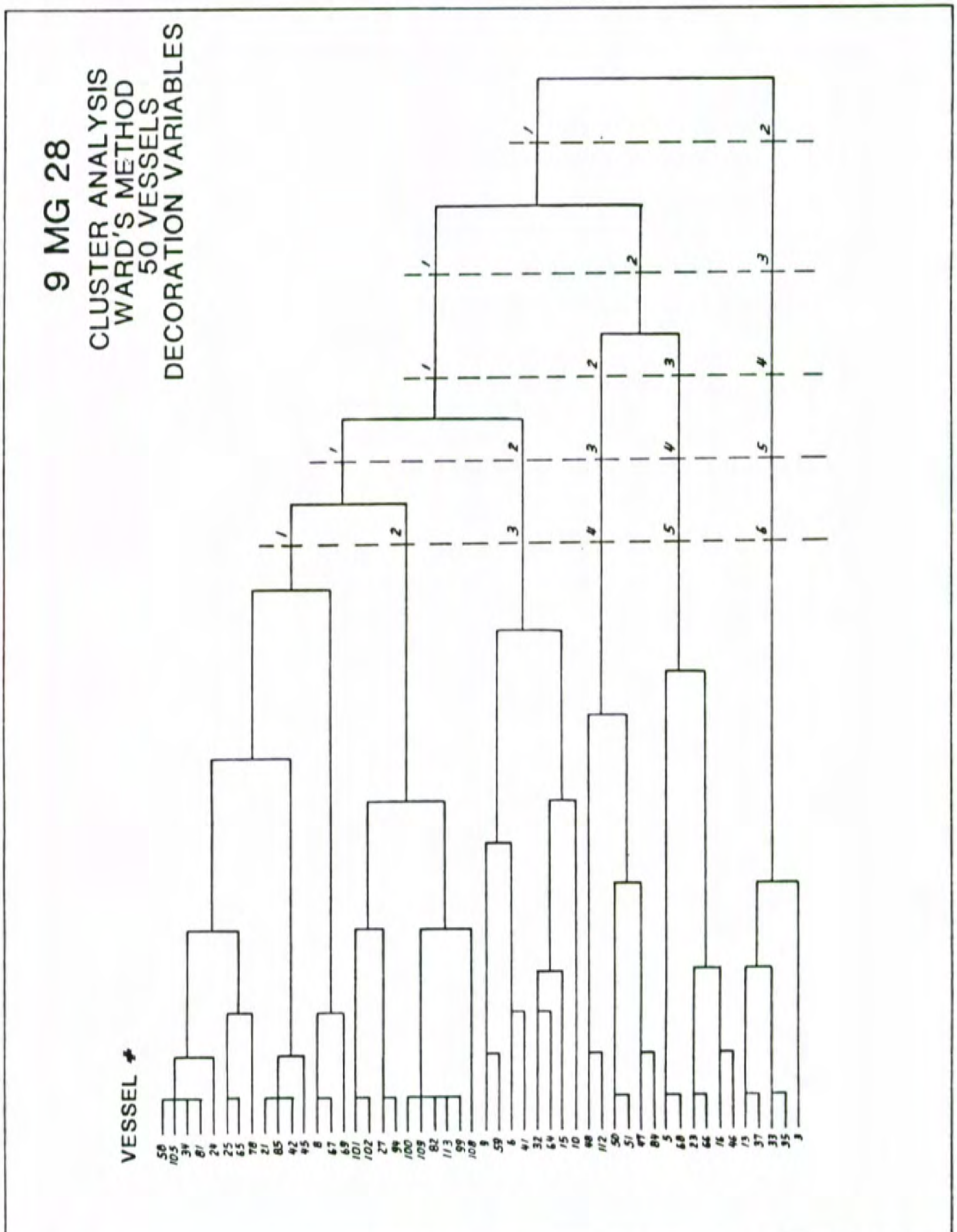

9 MG 28
CLUSTER ANALYSIS
WARD'S METHOD
50 VESSELS
DECORATION VARIABLES
VESSEL #

Figure 45

The pattern was not as pronounced here in the Ward's method however. Cluster 2 does not divide further to the level of analysis I will proceed but remains the separate final cluster even to the six cluster solution.

For the 3 cluster solution Cluster 1 of the 2 cluster solution divided into a larger group (Cluster 1) which is distinguished by designs that have a greater percentage of curved lines in the design and a smaller group (Cluster 2) which has designs with a lower percentage of curved lines. There is some overlap to be sure, but the general pattern is clear.

The split to the four cluster level results from the splitting of Cluster 2 from the previous three cluster solution. There is no clear single reason for this division, but rather, at least five slight differences are noted. First Cluster 2 (of this four cluster solution) has some smoothing over the designs while those of Cluster 3 do not. Cluster 2 designs have a greater percentage of the vessel surface decorated than those in Cluster 3. Zone lines are present both above and below the decorated area in Cluster 2 but not in Cluster 3. Fourth, although both of these designs have fewer elements than Cluster 4 (the originally separated Cluster 2 of the 2 cluster solution), Cluster 2 has more elements than Cluster 3. Finally, although both of these clusters have a lower percentage of curved lines than Cluster 1 (Cluster 1 of the three and four cluster solution), Cluster 2 designs have a larger percentage of curved lines than do the Cluster 3 designs.

For the five cluster solution Cluster 1 of the four (and three) cluster solution divide into two clusters, new Clusters 1 and 2. As with the previous split just discussed for the four cluster solution, the reasons for this split are multiple and not completely distinct. Cluster 1 has vessels that have a lower percentage of their surface covered with decoration than those in Cluster 2. Cluster 2 has no smoothing over the designs while many of those in Cluster 1 do have smoothing. Finally, although both of these clusters have a greater percentage of curved lines in their designs than those of Clusters 3 and 4 (Cluster 2 of the three cluster solution), Cluster 2 designs have a slightly higher percentage of curved lines than do those of Cluster 1.

The final split I will detail is the six cluster solution. For this solution Cluster 1 of the previous five cluster solutions divide into two clusters. New Cluster 1 designs have slightly fewer elements than do Cluster 2 designs. Cluster 2 designs have smoothing over virtually all designs while Cluster 1 is much more variable. Similarly Cluster 2 has only a top zone line present on the designs, while Cluster 1 is far more variable. In fact the division into these two clusters does not appear particularly strong and this is one reason no further clusters to the left were subdivided.

The Ward's method analysis used more of the variables to divide the designs into six clusters than did the Complete Linkage method thus making it more difficult to interpret. That doesn't make it wrong however. Both techniques showed that the number of elements in a design to be the most important variable in classifying the designs. Both also showed that the quality of the design, the presence or absence of smoothing over the designs, and the percentage of curved lines were important secondary variables. The variation in the zone lines was used only in the Ward's method as a critical variable, and then at a

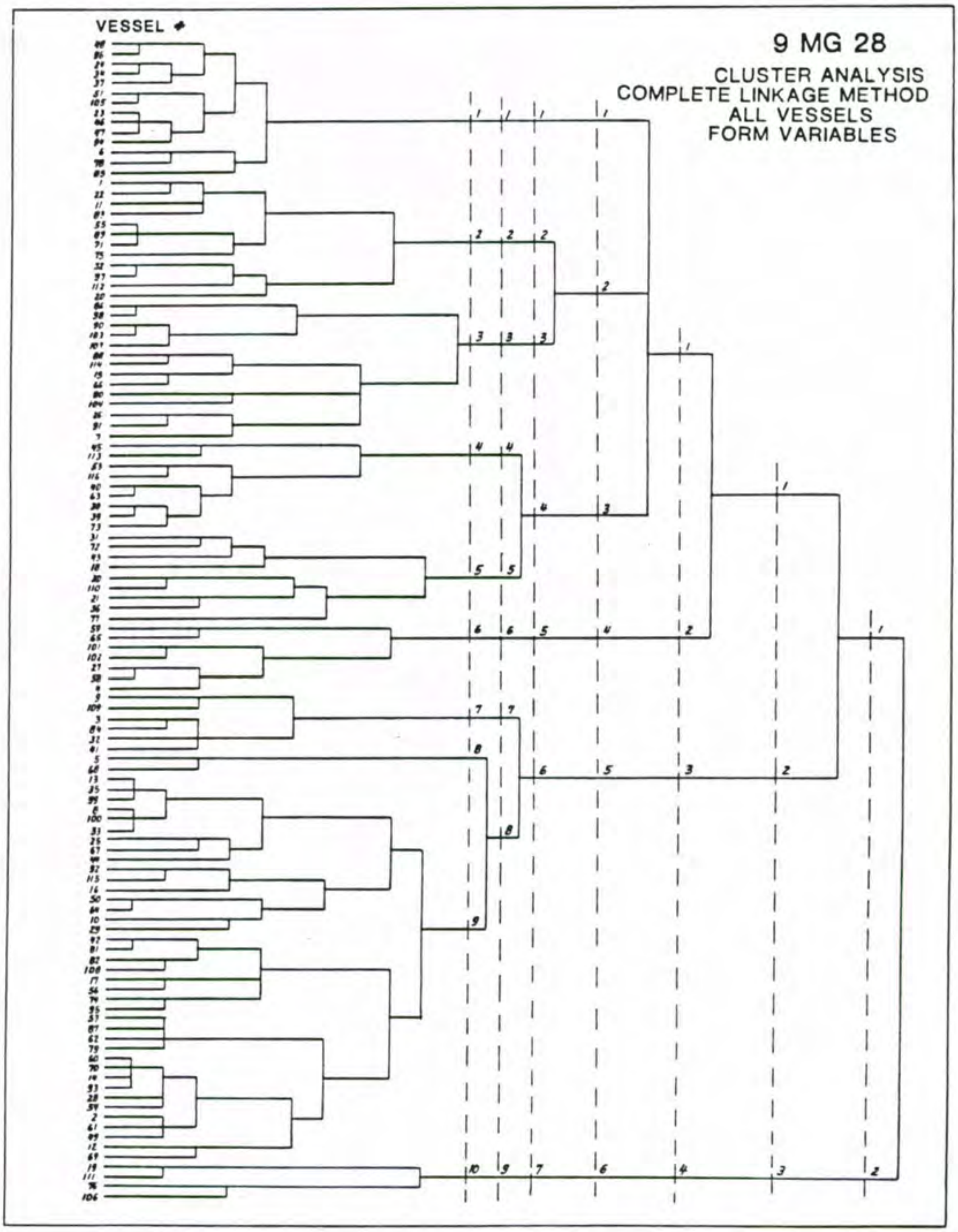
Lower level. It is interesting but confusing that, for the Ward's method, the number of elements, the percentage of curved lines, and the degree of smoothing over the designs were all used at different levels as critical variables in the analysis. For the Complete Linkage only the percentage of curved lines was used at two levels.

Of both analyses and their respective different cluster solutions, the one most intuitively appealing is the four cluster solution for the Complete Linkage analysis. This divides the designs into four groups based on two variables. Thus the four categories of designs would be designs with fewer elements of low and high quality and designs of many elements of low and high quality. Whether these categories were recognized by the makers of the vessels is unknown. Perhaps the low/high quality dichotomy relates to experienced vs. neophyte design producers (and thus pot makers) but this is uncertain. Certainly mothers taught their daughters these designs, or at least how to do them. Learned behavior being what it is one would expect the early products (designs in this case) of young patterns to be somewhat less well done than those of the experienced veteran potter. If this is true, it would also indicate that beginners were not limited in the number of elements or lines they could employ in their designs (even if the design was constrained by rigid cultural requirements) as high and low quality designs occur on designs with either few or many elements. No socio-cultural reasons to explain the variation in number of lines in a design are known.

Form Variables, Complete Linkage

There were 22 variables utilized in this and the following analysis which was done on 116 vessels. These included the following variables: 3) maximum height, 4) lip diameter, 5) maximum diameter, 6) distance from the lip to the point of maximum diameter, 7) neck diameter, 8) distance from lip to neck, 9) shoulder diameter, 10) distance from lip to shoulder, 11) bottom diameter, 16) amount of temper in the paste, 17) size of the temper in the paste, 18) bottom shape, 19) amount of wear on the bottom, 22) presence of fire clouds on the vessel surfaces, 23) inner surface texture, 24) outer surface texture, 27) rim form, 28) rim shape, 29) lip shape, 30) width of rim strip when present, 31) distance between pinches, notches, or punctates on bold rims, and finally 32) whether the vessel had any decoration or not. This final variable probably should have been omitted, but was added as a "form" variable. It does not, of course, tell anything about the decorations themselves. Several of these variables were not common in the data set, generally due to missing data. Following detailed analysis of the cluster results further comments about the variables will be made.

The cluster results for this particular analysis are presented in Figure 46. The initial split into two clusters at the right of the chart is based upon two things. The first and most important is based upon vessel size. The few vessels in Cluster 2 are very large vessels --larger than those in Cluster 1. Although there are some vessels of moderately large size in Cluster 1 those of Cluster 2 are larger over all. Further the vessels in Cluster 2 are all plain, while Cluster 1 includes both plain and decorated vessels. Cluster 2 does not further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CLUSTER ANALYSIS
COMPLETE LINKAGE METHOD
ALL VESSELS
FORM VARIABLES

Figure 46

divide to the maximum level of analysis to be investigated here and remains thus a separate cluster of very large plain vessels.

Cluster 1 divides for a three cluster solution into two clusters. The characteristics which define these two clusters are not too clear, but have considerable overlap. New Cluster 1 has 63% plain vessels while new Cluster 2 has only 38% plain vessels. Cluster 1 has slightly more excurvate rim vessels while Cluster 2 has more incurvate rim vessels. Cluster 1 has 56% folded rims while Cluster 2 has only 35% folded rims. Finally Cluster 2 has vessels with slightly less and slightly finer temper than those vessels in Cluster 1. It is interesting that vessel size plays no part in this division.

For the four cluster solution to this problem Cluster 1 of the three cluster solution divides into two clusters. The multiple variable explanations for this division are clearer, if numerous. New Cluster 1 has vessels that are larger--in height, lip diameter, and maximum diameter-- than those in new Cluster 2. Of the vessels in Cluster 1 68% are plain while only 14% are plain in Cluster 2. Similarly 64% of the vessels in Cluster 1 have folded rims while 0% of those in Cluster 2 are folded. Further the Cluster 2 vessels are slightly rougher inside and out than the Cluster 1 vessels. Finally, 80% of the vessels in Cluster 2 have incurvate rims while only 39% of those in Cluster 1 are of this type. It should be noted that Cluster 2 has but few vessels compared to Cluster 1. Indeed, it is unclear why the vessels in Cluster 2 are grouped closerto those in Cluster 1 than Cluster 3. Possibly it relates to the surface textures as those of Cluster 2 are far rougher than those of Cluster 3 and closer to Cluster 1 in terms of this variable.

The next level of cluster solution is the six cluster level. There is no five cluster solution because Cluster 1 of the four cluster solution (the largest of those) divides into three separate clusters at the next lower level. These new clusters are numbers 1, 2, and 3 respectively for the six cluster solution. Cluster 1 is more easily explained than the separation between Clusters 2 and 3. I should first say, however, that there is slight evidence that the vessels of Cluster 1 are the largest of the three, those of Cluster 2 the smallest, and those of Cluster 2 intermediate in size. This certainly would be the simplest solution to this three part division, but there is much overlap and the other variables also make this less than certain. Cluster 1 for example has vessels which are all incurvate with simple rims and rounded lips. Further they are all incised. Cluster 2 vessels are 88% plain and Cluster 3 vessels are 89% plain. Of the Cluster 2 vessels 94% have folded rims while 87% of those in Cluster 3. The only striking difference between Cluster 2 and 3 vessels relates to the percentage of excurvate rims, Cluster 2 having 88% of this form while Cluster 3 has only 53% excurvate. Questions here are why is Cluster 1 with Clusters 2 and 3 and why do Cluster 2 and 3 separate from each other? Probably the coarser textures and greater amount of and coarser temper are critical variables but this is not certain. Cluster 1 does not further divide to the level of analysis undertaken here.

For the seven cluster solution Cluster 2 of the six cluster solution divides into two new clusters--Clusters 2 and 3 of this solution. New Cluster 2 vessels have vessels that are larger in diameter (lip and maximum), but are slightly shorter than those vessels in Cluster 3. Thus they (Cluster 2 vessels) are "squatter" than those of Cluster 3.

The next level of analysis is the nine cluster solution. Both Clusters 4 and 6 of the seven cluster solution split at this level (Figure 40). For new Clusters 4 and 5 (from Cluster 4 of the 7) the division is apparently based on height more than any other variable. Those vessels in Cluster 4 are generally taller than the vessels in Cluster 5. New Clusters 7 and 8 (derived from the sixth cluster of the seven cluster solution) apparently are also separated based upon vessel size, those in Cluster 7 are definitely smaller than those of Cluster 8, which could be called medium sized vessels. Further all of the vessels in Cluster 7 are incised while many of those in Cluster 8 are not.

The final overall level of analysis to be here presented is the ten cluster level. For this analysis Cluster 8 of the 9 cluster solution divides into Clusters 8 and 9 of the new ten cluster solution. Cluster 8 is easily recognized as the two (and only two) open bowls with T shaped rims that were recovered from the site. Their form (and decoration for that matter) is virtually identical, although one is slightly larger than the other. Cluster 9 is not so easily interpreted. This represents the bulk of the vessels which were originally split off as Cluster 2 of the three cluster solution and thus represent all the vessels with finer and smaller amounts of temper (and slightly smoother surface textures). Beyond that fact not much can be said of Cluster 9 directly. It is the largest of all the clusters at the ten cluster solution level of analysis and it was deemed worthy of investigation to see how this cluster divided. Rather than analyze all of the clusters to this greater detail just this cluster was further studied. Letters and numbers will be used as modifiers for the sub-units of Cluster 9.

The first division of Cluster 9 is into Clusters 9A and 9B based apparently on vessel height. The vessels of Cluster 9A are taller than those of Cluster 9B. Cluster 9A divides into two clusters called 9A1 and 9A2. The vessels of Cluster 9A1 have incurvate and unfolded (simple) rims. Further they are all incised. Conversely the vessels of Cluster 9A2 have folded rims and most are excurvate with shoulders below. About half of the vessels in Cluster 9A2 are incised and half are plain. Cluster 9B divides similarly into two clusters--Clusters 9B1 and 9B2. As with Cluster 9A1, Cluster 9B1 has vessels which have incurvate rims. However, as with Cluster 9A2, only about half of the vessels in Cluster 9B1 are incised. The vessels of Cluster 9B2 are all plain and the most common rim form is neither incurvate nor excurvate, but simply straight.

Overall several observations can be made about the variables used to produce this cluster chart. First, in terms of variables of vessel size, the only one that seemed to be used separately from all the others in unison was vessel height and this was used separately in several places. Other than that, none of the other size variables (Variables 2 through 10) were utilized separately from each other, but all worked in concert to produce a measure of vessel size. This seems to indicate that they might all be usefully replaced by a single measure of the volume of a given vessel, although this is uncertain. Secondly, the variables degree of bottom wear, fire clouds, lip shape, rim strip width, and rim node distance (Variables 13, 14, 19, 20, and 21 of the list at the beginning of this section) were not really utilized at all and might be interpreted as relatively unimportant variables in the classification of these vessels. Thirdly, the size variables were important variable(s), but not the only important ones. The characteristics of temper were surprisingly important (all the more so since as shown earlier these variables do not correlate statistically with any other vessels). Perhaps reflective of the temper (and perhaps not) the surface textures were also useful variables in the classification. The rim shape (incurvate, straight, or excurvate) and rim form (simple or folded) variables were also useful in interpreting the results. Finally whether a vessel was plain or decorated was utilized repeatedly in the analysis and must be assumed to correlate with overall vessel form.

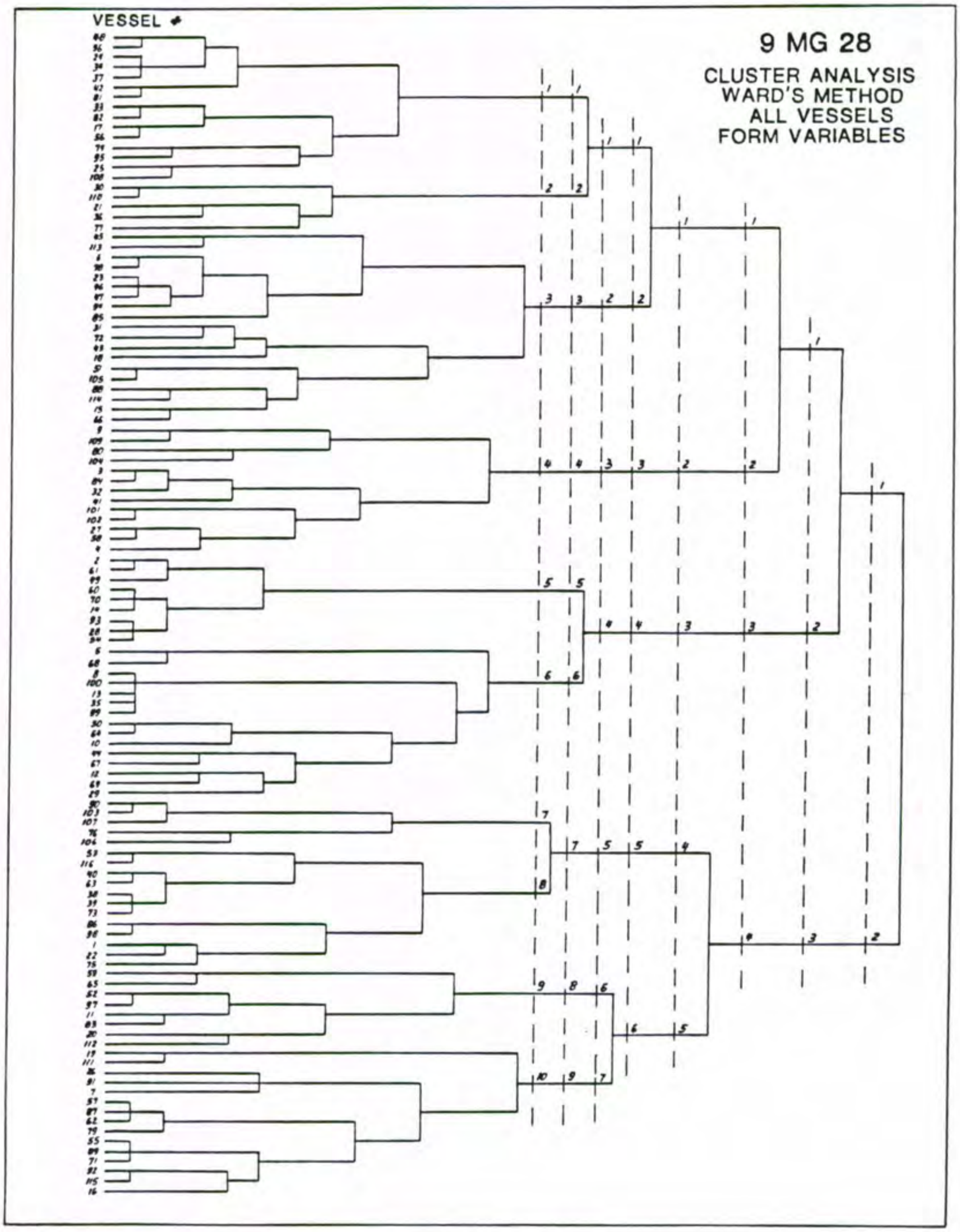
Form Variables, Ward's Method

A pattern in the analysis seen in the earlier described design cluster analysis is repeated here. That is, as discussed at that point, there were 15 small clusters or groups from the design variable Complete Linkage analysis that were repeated on the Ward's method analysis, although grouped together differently. For the form analysis using Complete Linkage there were a total of 36 small groups or clusters all of which were duplicated for the Ward's method analysis and discussion here. As before, however, these small groups (ranging in size from two to seven vessels) were grouped differently in this analysis. Also, as with the previous Complete Linkage form analysis, the reasons for the groupings of vessels into clusters is not particularly clear cut, and in fact involved even more variables at each step than did the Complete Linkage. In fact, the groupings to be discussed below were not as "tight" as with the just completed Complete Linkage form analysis and it could therefore be argued that those results are perhaps "better", but at this level of analysis judgements of this sort are always open to question.

At the far right of the Ward's method form analysis (Figure 47) the 116 vessels divide into two clusters. Of those in Cluster 1, 33% are plain while 90% are plain in Cluster 2. Further only 32% of those in Cluster 1 had folded rims while 85% of those in Cluster 2 were folded. Finally, 68% of the Cluster 1 vessels had incurvate rims while only 11% of those in Cluster 2 were of this form.

Cluster 2 remains undivided through the next two levels of analysis. For the three cluster solution, however, Cluster 1 divided into two clusters--new Clusters 1 and 2. The major dividing factor here is apparently vessel size as those in Cluster 1 are generally smaller than those in Cluster 2. Other minor differences are as follows. The percentage of plain vessels is but 28% in Cluster 1 and is 44% in Cluster 2. Further, but 7% of the rims in Cluster 1 are straight (as opposed to incurvate or excurvate) while Cluster 2 has 25% straight rims. Again, however, size appears to be the major criterion for this division.

The four cluster solution is created by the division of Cluster 1 of the three cluster solution into two separate clusters. This forms new Clusters 1 and 2. The difference here is not of size but seems to relate to the temper, surface textures, and rim forms. The vessels of Cluster 2 have smoother (closer to burnished) surface, both inside and out, and have smaller amounts and finer sized temper in the paste. A total of 62% of the vessels in Cluster 2 have folded rims while only 32% of those in Cluster 1 have folded rims. One final difference involves the lips of the vessels. Of the vessels in Cluster 1 35% have squared or flattened lips while only 15% of the vessels in Cluster 2 have this trait.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CLUSTER ANALYSIS
WARD'S METHOD
ALL VESSELS
FORM VARIABLES

Figure 47

These two clusters don't divide for the next five cluster solutions. The fourth or last cluster of the four cluster solution is the one that divides for this solution into two clusters, new Clusters 4 and 5. The difference here are as follows. For the vessels in Cluster 4 93% are excurvate while but 61% are of this form in Cluster 5. A total of 93% of the Cluster 4 vessels have folded rims, while only 76% of those in Cluster 5 have this form of rim. Minor difference between these clusters include the fact that the vessels of Cluster 5 have slightly smoother surfaces than do those of Cluster 4 and the lips on the vessels from Cluster 4 are slightly more likely to be rounded than those of Cluster 5 (73% vs. 55%).

For the next six cluster solution Cluster 1 of the five cluster solution divides into new Clusters 1 and 2. A total of 93% of the vessels in Cluster 1 have incurvate rims while only 63% of those in Cluster 2 are of this style. But 44% of the vessels in Cluster 1 have round lips while 73% of those in Cluster 2 are round. In a case where temper and texture do not coincide, the vessels of Cluster 1 have slightly less temper and slightly finer temper than the vessels in Cluster 2, but the Cluster 2 vessels are slightly more burnished than those in Cluster 1. Finally, the vessels of Cluster 2 have slightly less frequency of fire clouds on the surface of the vessels than do those of Cluster 1.

The seven cluster solution is formed by the division of Cluster 6 of the six cluster solution into two new clusters, Clusters 6 and 7. A number of differences are evident here. First, the vessels of Cluster 7 have more fire clouds than do those of Cluster 6. The interior and exterior surfaces of the vessels in Cluster 7 are about the same degree of smoothness, but those of Cluster 6 are generally rougher on the outside and smoother on the inside than the vessels of Cluster 7. Of the vesselsin Cluster 7 94% are plain while only 63% of the Cluster 6 vessels are plain. While 60% of the rims on the vessels of Cluster 6 are folded, a total of 81% of those in Cluster 7 are folded. Further, while none of the lips on the Cluster 6 vessels are square or flattened, 44% of those in Cluster 7 are of this form. The vessels in Cluster 6 have slightly less temper and slightly finer temper than the Cluster 7 vessels. When there are so many differences between clusters such as this it is obviously difficult to pick any one or two variables as the most important ones in the separation.

The next level of cluster analysis is the nine cluster solution. This is true because two of the seven cluster solution cluster each divides into two clusters. Cluster 1 of the seven cluster solution divides into new Clusters 1 and 2 while Cluster 4 of the seven cluster solution divides into new Cluster 5 and 6. New Cluster 1 contains vessels 90% of which have but simple unfolded rims, while but 33% of the vessels in Cluster 2 have simple rims. Perhaps of most importance for this split is the variable of lip shape. A total of 62% of the vessels in Cluster 1 have a square or flattened lip while none of those in Cluster 2, albeit a small cluster, have this trait. One final distinction between these 2 clusters is in their relative proportions of plain to incised vessels. Within Cluster 1, but 31% of the vessels are plain, while in Cluster 2 67% of the vessels are plain.

The differences between Clusters 5 and 6 of the nine cluster solution are as follows. The largest, but not the only difference is that all of the vessels in Cluster 5 are plain while only 13% of those in Cluster 6 are undecorated. Further the vessels in Cluster 5 are slightly smaller than those in Cluster 6. Another significant difference involves rim shape. A total of 78% of the Cluster 5 vessels have straight (not incurvate or excurvate) rims while none of the vessels in Cluster 6 are of this style. Rather, 73% of these vessels are incurvate. Lesser differences are, first, rim shape and, second, lip shape. The percentage of vessels in Cluster 5 with simple, unfolded rims is 63 while the percentage for Cluster 6 is 89. Conversely, the proportion of vessels in Cluster 5 with square or flattened lips was but 22% while in Cluster 6 the same trait was present on 53% of the vessels.

The final level of analysis to be discussed here is the ten cluster solution. It should be noted that for this dendrogram (Figure 47) there is no obvious place to stop the analysis and so I stop at the same number of clusters analyzed for the previous Complete Linkage analysis. For this final step Cluster 7 of the nine cluster solution divides into two new clusters--Clusters 7 and 8. The only diagnostic difference discovered between these two clusters relates to the lip shape. While 100% of the vessels in Clusters 8 have rounded lips, only 20% of those in Cluster 7 are rounded.

In comparison to the previously described Complete Linkage analysis, more variables were apparently critical to the results in the Ward's method form analysis. In particular, both fire clouds and lip shape were important in the latter but not the former. Rim strip width, rim node distance, and bottom wear were, however, not important for the Ward's method analysis just as they were not in the Complete Linkage analysis. Another point that needs attention is the simple observation that for this vessel form analysis, vessel size, while important at specific points in the analysis, is not the only critical set of variables in the classification. It appears, for instance, that the temper of certain vessels groups is distinct--the second division (from a two cluster to a three cluster solution) in the Complete Linkage analysis apparently divides according to temper as much or more than anything else. This is interesting because temper did not correlate (see discussion in previous chapter) strongly with other variables when all the vessels were considered together. It is not really possible to select a "best" solution from these two methods although heavier weight is given to the Complete Linkage analysis. Different variables are often used at the same depth of analysis on different lines for the two methods. Further, the same variables may be used at both a higher and lower level of the analysis. What can best be said, perhaps, is that the classification of these vessels is quite complicated, far more so than was originally anticipated. This grows directly out of the fact that the computer, with more variables at hand for analysis, sees problems with overly simple classifications based on just a few variables.

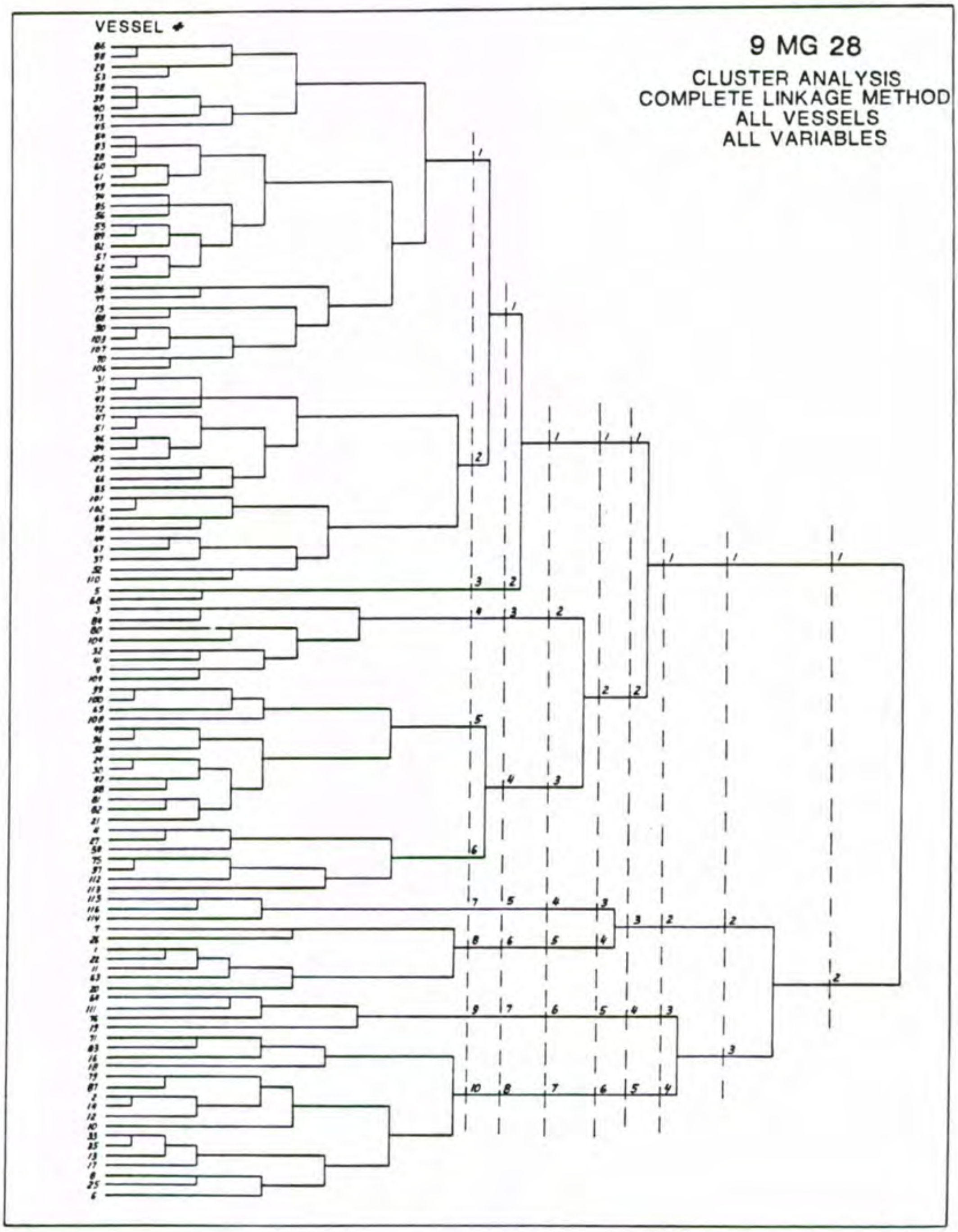
## All Variables, Complete Linkage

Given the problem of interpreting the results of the just discussed form analysis, it would seem likely that the addition of other variables would make the analysis probably even more complicated and less directly interpretable. This is indeed the case, although the results are far from useless. In a manner similar to the previous form analyses, the Complete Linkage analysis is the tighter of the two cluster analyses using all the variables. It should be noted that four additional variables not used in either the previously discussed decoration analysis or the form analysis are included here. These are: 1) the feature on the site from which the particular vessel fragment was recovered, 2) the percentage of each vessel present in the reconstructed form, 45) the number of sherds in each reconstructed vessel, and 46) the total weight of each reconstructed vessel fragment. The analysis of both the Complete Linkage and Ward's method cluster results will, as with the form results, not be taken beyond the ten cluster solution.

The first division (actually the final level of combination) yields the two cluster solution (Figure 48). The only variable that seems to be involved here is the newly introduced variable of percentage of vessel present. Cluster 1 has vessels that are generally less complete than those of Cluter 2. It should be noted that it is felt that, with all evidence in hand, the differential proportion of vessels recovered from the features at 9Mg28 represents an actual cultural pattern rather than an accident of preservation and erosion, although the role of the latter can't be completely dismissed. This is particularly important in light of Hally's recent work demonstrating that partial vessels were often used as whole artifacts in the Late Prehistoric Southeast (1980a,b).

The three cluster solution is formed through the division of Cluster 2. The vessels of new Cluster 3 are larger than those of Cluster 2. The Cluster 3 vessels apparently have slightly smoother inside and outside surface textures than do those of Cluster 2. No other variables seem to describe these clusters.

For the four cluster solution Cluster 3 just described divides into new Clusters 3 and 4. Cluster 3 represents almost the same cluster of large, excurvate folded rim vessels, mostly plain, which was separated in the first step of the Complete Linkage analysis of the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ALL VESSELS
ALL VARIABLES

Figure 48

form variables. The folded rims are all pinched and the surfaces are slightly smoother than the vessels of Cluster 4. The vessels of Cluster 4 are apparently distinguished by the fact that the vessels in that cluster are the most complete in reconstruction of all the large vessels from the site. Note that the small and some medium almost complete vessels are not in this cluster. Beyond the constraint of large, almost complete vessels the cluster includes vessels of all shapes both plain and incised, and with many rim forms. This cluster does not further sub-divide to the level of the ten cluster solution, although it does break down into apparent form groups to the far left (Figure 48).

The five cluster solution is formed through the division of Cluster 1 of all the previous solutions into two clusters, new Clusters 1 and 2. The reason for this split are not clear cut at all. In general however, the vessels of Cluster 2 are smaller than those in Cluster 1. In fact, although they are not all small, Cluster 2 does contain the smallest vessels from the site. The Cluster 1 vessels are not as large as those discussed earlier for Cluster 3 of the 3 cluster solution, but do overlap with those more complete vessels in Cluster 2 of the 3 cluster solution. The only other list of information possibly separating Clusters 1 and 2 (of the five cluster solution) is the plain-decorated ratios. While Cluster 1 vessels were about equally distributed between the plain and incised categories, those from Cluster 2 were more likely to be decorated (incised).

For the six cluster solution, Cluster 3 of the five cluster solution divides into new Clusters 3 and 4. The vessels in both these clusters are plain folded rim bowls and are generally rough. The only variable that seems to differ markedly for the two clusters is the location on the site from which the vessels came. The vessels of Cluster 4 came from the large trash Features 1, 2, and 5 while the vessels from Cluster 3 were from Features 12, 18, and 19. Of interest here is the fact that these latter features had but one vessel fragment in each and thus Cluster 3 contains but these three vessels.

In progressing to the seven cluster solution, Cluster 2 of the six cluster solution divides into new Clusters 2 and 3. Cluster 2 contains most of the smallest vessels on the site although there are many shapes present, ranging from the almost spherical Vessels 3 and 84 to very small jars and a few aberrant forms. Most of these vessels are burnished. The Cluster 3 vessels are all incurvate simple rim bowls ("cazuellas"). They range from smooth to coarse in surface textures. As with Cluster 2 almost all are incised. They range from quite small up to medium sized vessels.

The eight cluster solution divides Cluster 1 from the previous seven (as well as the six and five) cluster solution into new Clusters 1 and 2. This separation is easily explained as new Cluster 2 consists of but two vessels, the two from the site which have T-shaped rims. These open bowls have incising on the top flat surface of this T-shaped rim. Cluster 1 can only be described then as medium sized less complete vessels.

For the next and final level of analysis we go to the ten cluster solution. Two clusters, Cluster 1 just discussed, and Cluster 4 of the previous eight cluster solution divide for this step. New Clusters 1 and 2 are formed from old (eight cluster solution) Cluster 1. Cluster 2 of this final solution contains incurvate, simple rim ("cazuella") bowls, all of which are incised and all of which are relatively coarse textured and heavily tempered. Cluster 1, however, contains vessels of several shapes all of which are plain. Further the vessels of Cluster 1 generally have smoother surfaces than those of Cluster 2.

Cluster 4 of the eight cluster solution divides into new Clusters 5 and 6. Cluster 5 contains incurvate, simple rim, incised vessels that are of medium size and have fairly smooth vessel surfaces. Cluster 6 on the other hand has small vessels (some as small as those in Cluster 4 of this the ten cluster solution). There are a few plain vessels along with the incised in this cluster and there is much variation in vessel smoothness and temper size and amount compared to Cluster 5.

This is as deep as the analysis is to be presented here, although most of the individual clusters are formed from smaller and smaller groups as is seen in Figure 48. Overall, the important variables in the analysis to this level seem to be of the form nature rather than those of decoration (other than plain vs. incised). The variables of percentage present, vessel size, surface texture, plain vs. incised, and location have played the largest role in the analysis to the ten cluster level. Perhaps the most surprising of these is that of percentage of vessel present, although it is also noteworthy that surface smoothness was so important. Neither of these was anticipated. The analysis seems somewhat closer to the previous form analysis than the decoration analysis and it may be best to ignore decoration in future experiments of this sort. Further, with as many variables as were used in this analysis (a full 38) analysis was extremely slow and difficult.

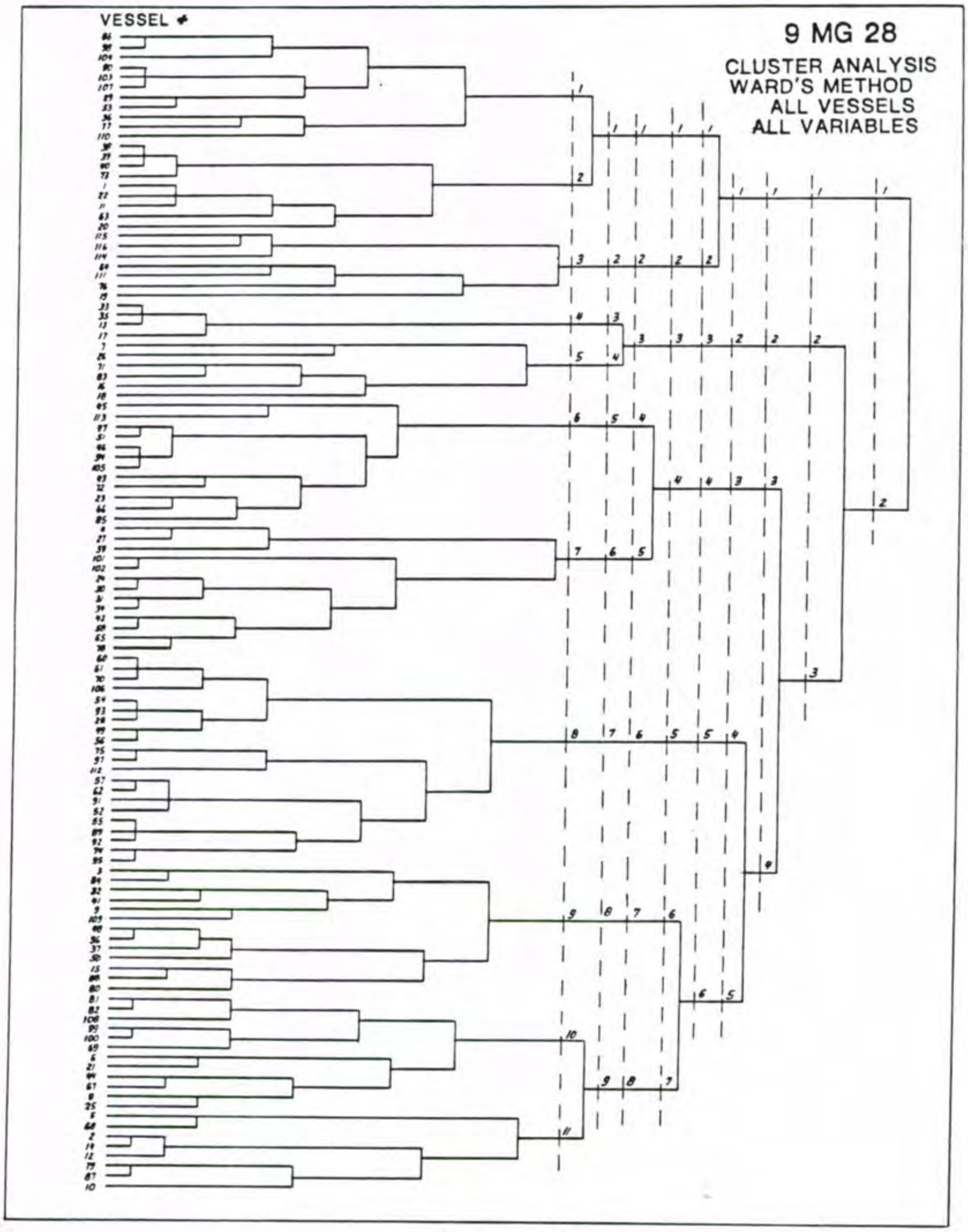
All Variables, Ward' Method

Just as with the earlier form analysis and, to a more limited degree, with the decoration analysis, the Ward's method analysis here produces clusters that combine at higher levels than do those of their Complete Linkage counterparts. Indeed, this is perhaps the least interpretable at the present time of all the presentations. The reasons for the first two divisions to be discussed shortly are quite vague at the present. Still, there is some useful information to be derived from the approach upon inspection of the lower levels.

The first division into two clusters for this analysis is very unclear (Figure 49). Cluster 1 contains vessels that are all plain, have folded rims, and are of medium to large size. Cluster 2 can best be said to contain everything else, except that it also contains vessels that should fit in Cluster 1. Actually this is not too surprising as this was often true, if to a lesser extent, in most of the other cluster charts. Perhaps computer algorithm designed to reassign vessels after the initial creation on cluster would clear this up, but that will not be done here.

The five cluster solution is formed through the division of very broad Cluster 2 of the previous step. New Clusters 2 and 3 apparently are determined primarily by the degree of vessel completeness those in Cluster 2 are vessels that are almost complete in reconstruction while those in Cluster 3 are not so complete on the average. Unfortunately, there are vessels in Cluster 3 that are as complete as those in Cluster 2 and virtually identical in form.

For the four cluster solution Cluster 3, of the three cluster solution (the least clear thus far) divides into new Clusters 3 and 4.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WARD'S METHOD
ALL VESSELS
ALL VARIABLES

Figure 49

The vessels of new Cluster 3 are mostly incised vessels of medium size and tend to have rough vessel surfaces and a lot of coarse temper. On many of the incised decorations, the quality is low to medium. Most of the vessels here are relatively incomplete (with the notable exception of Vessel 4 which is a small intact vessel). It is quite likely that the vessels represented here also have but few sherds (a whole vessel = 1 "sherd", unfortunately) in reconstruction. This of course, usually correlates with percentage present. The vessels of Cluster 4 are both plain and incised, generally have smoother surfaces, and have less coarse temper. Further they are generally more complete than the Cluster 3 vessels.

The five cluster solution is formed through the division of the last cluster from the previous solution. The vessels in new Cluster 4 are all plain and are less complete than the vessels in Cluster 5. The surfaces are burnished or well smoothed. Cluster 5 vessels are mostly incised, medium to medium large vessels which are often fairly complete. The shapes included vary a good deal. They are generally more complete also.

In the six cluster solution, Cluster 1 from all of the previous solutions finally divides into new Clusters 1 and 2. As stated earlier, both of these clusters are of plain, folded rim vessels. The only apparent difference bewteen Clusters 1 and 2 at this level of analysis is in vessel size. The vessels of Cluster 1 are of a medium size, while those of Cluster 2 are larger vessels--in fact the largest vessels from the site are in this cluster.

For the seven cluster solution, Cluster 6 of the previous six cluster solution divides into Clusters 6 and 7. The reasons for this division are not clear although many of the vessels in Cluster 6 have shoulders --i.e. are recurved jars, while the vessels of Cluster 7 are either simple open bowls or incurved rim bowls. This distinction between these clusters is not perfect, however.

The eight cluster solution divides Cluster 4 of the seven (and six) cluster solution into the two new Clusters 4 and 5. Both of these clusters have incised incurvate rim bowls that are relatively coarse in texture and have large temper particles. There are three apparent differences between the clusters, however. The first relates to vessel size. While the vessels of Cluster 4 are almost all medium sized, Cluster 5 vessels are small to medium size. The smallest single vessel from the site is in this cluster. The decorated vessels of Cluster 5 generally are poorer in decoration quality than those of Cluster 4 and they are generally more complete in reconstruction.

The nine cluster solution divide Cluster 3 of the six, seven, and eight cluster solutions into new Clusters 4 and 5, both of which have but few vessels present. Together these clusters represented those vessels which were almost complete (at least some of them). The division into the two new clusters is relatively clear-cut. The vessels in Cluster 4 are large, incised, incurvate, simple rim bowls. They are greater than 80% complete in reconstruction. On the contrary, the Cluster 5 vessels are plain jars with folded rims. They are greater than 60% complete in reconstruction.

The final level of analysis presented here is the eleven cluster solution. Two clusters, Clusters 1 and 9 from the nine cluster solution both are joined at the same level, thus there is no ten cluster solution. The reasons for the division of old Cluster 1 into new Clusters 1 and 2 is fairly clear. New Cluster 1 has medium sized, plain, folded rim vessels (as does new Cluster 2) which are smoother in surface texture than the vessels in Cluster 2. The folded rims of Cluster 1 vessels are usually notched with stick or some other implement. The vessels of new Cluster 2 are rougher in surface texture and their folded rims have been pinched with the fingers of the pottery rather than having been notched with a tool. The correlation in these clusters between surface texture and folded rim type is surprising and unexpected.

Cluster 9 of the nine cluster solution divides into new Clusters 10 and 11. New Cluster 10 has incised incurvate rim bowls of medium size. Cluster 11 has both plain and incised vessels (most are plain) most of which have simple excurvate rims but one is folded and two are T-shaped rims.

For this analysis, then, the highest levels of cluster combinations are not easily explained, but the lower levels are fairly clear. The variables of most importance are vessel size, surface texture, percentage present, and whether a vessel was plain or decorated. The distinction between notched and pinched folded rims was used once, as was decoration quality. Beyond these variables, all the others seemed to have had but minor input to the classification.

By way of summary for the cluster analyses detailed in this chapter the following comments are presented. My comments here will be restricted to the Complete Linkage analyses because this method tended to produce tighter clusters than did the Ward's method analyses. The first experiment attempted to classify the incised vessel decorations into groups of decorations that were similar. Only five of the twelve variables used for the 50 vessels included in this analysis were apparently important in the analysis to the six cluster level solution. These include: 1) number of lines in the design, 2) quality of execution, 3) percentage of curved lines, 4) presence of smoothing over the designs, and 5) percentage of vessel surface decorated. Correlations between these six design clusters and different vessel shapes should be investigated in the future.

The Complete Linkage analysis of just the variables of form (excluding decoration) yielded a final grouping of 10 clusters of vessels. Of the 22 variables used in this analysis, only five (bottom wear, fire clouds, lip shape, rim strip width, and rim node distance) of these were apparently not used in the analysis by the computer. The variables of size were definitely important as were those of temper, rim shape, and rim form. Future work should attempt to correlate these groupings with those from the previous chapter.

The final Complete Linkage classification presented above uses all of the variables of the above two experiments plus those of location, percent present, number of sherds, and weight of reconstructed fragment. A total of ten clusters were derived using this method. The variables of form seem to have had more direct affect on the cluster results than did those of decoration. Specific important variables in the classification were percentage present, vessel size, surface texture, plain vs. decorated, and the origin location of each vessel from the site.

Overall, for both this last experiment and that of form variables only, it is clear that we cannot completely ignore form variables that are not just ones of vessel shape and size but must recognize that these also produce patterns in the classification of vessels.

CHAPTER 11

# Vessel Analysis - Linguistic Study

## Introduction

Almost no use has been made in the past by ethnohistorians, cultural anthropologists, or archaeologists of the linguistic data available for the Southeastern Indians. Further, the number of trained linguists working on this material are few and the problems that have interested them in the past are quite specific. Most work on the southeastern Indian languages to this point has been either of a historical-comparative nature or of a descriptive nature. The former represents attempts, primarily performed by Mary Haas in recent years, to classify the southeastern languages, particularly the Muskogean ones, according to their genetic relationships one to the other. The results of this work will be reviewed shortly as a background for this chapter's ideas. The second of the areas of work on these languages involves descriptive studies on individual languages within (or formerly within) the southeastern U.S. These take on the form of studies aimed primarily at understanding and recording the structure of individual languages at the levels of phonemic, morphemic, and grammatical analysis. Studies of this sort, while the first essential step to an understanding of any language, rarely yield results directly usable by cultural anthropologists or archaeologists to help or aid their studies of the people who spoke these languages.

The point of view expressed here, however, is that there is a large amount of information recorded in the many dictionaries and word lists for the southeastern Indians (or any other group for that matter) that can increase our knowledge of the lifeways and world-views of these people. It is felt that perhaps the most important information present in this data source involves how the people classified things in their world. This cognitive information should be discoverable through analysis of the ways words are grouped within a given class of items in contrast to the way they are grouped in English. Berlin and Kay (1969) have studied color terms in other languages through this approach.

The category selected for analysis in this study was that of "containers" or objects used to hold something else. The specific goal of the analysis is to attempt to discover the categories of container use through an analysis of the schemes of classification inherent in the languages. It must be acknowledged here that if the people were still around speaking the language and making these containers, this information could more accurately, easily, and completely be obtained from living informants. Unfortunately, the few living descendants of the archaeologically recognized southeastern Indian groups have changed their culture (or had it changed for them) to the extent that original systems of classification about items no longer used (such as home-made pottery vessels) are mostly lost or misunderstood. It is hoped that by using the earliest word lists available most of this problem can be controlled or partially eliminated.

Although only the category of "containers" is to be examined here, many other categories could be analyzed in a similar manner in the future. These include settlements, animals, plants, tools, weapons, trash, ornaments, stones, cooking utensils, agricultural items, and clothing. Further items of interest would include colors, natural phenomena (such as wind, rain and snow) and natural features (such as hills, valleys, and rivers). Studies of each of these areas would be expected to tell us much about the world-view of human groups.

This study grows out of a concern with the containers (ceramic vessels here) at a particular archaeological site. Whether the vessels from this site were classified by the inhabitants in a manner similar to that revealed by this linguistic study is unknown. There are no historical records of visits by early European explorers to the Joe Bell site, nor even to the general vicinity of it until almost the end of the 18th century. By that time the site had been long abandoned. There is no certainty even as to the ethnic identity of the people at this site, even though it was occupied around A.D. 1630. The best guess is that they were a Muskogean group, but even this can not be certain. The linguistic data analyzed here, then, cannot with certainty be tied to the people who lived at this site, but this is always the case with analogues. It can be argued that related languages (such as the Muskogean languages) should have generally similar classification schemes for similar things, but this is unproven. At least a classification scheme for these containers derived from any southeastern language should be more apt to reveal a more similar classification scheme than would that from any European language (such as English).

Because no certainty could be placed on an ethnic identity for the people living at the Joe Bell site and because the available linguistic information is unevenly detailed over the many languages for which some is available it was decided to collect material from as many different southeastern languages as possible. The decision to include a specific language in the analysis was then determined only by availability of data for that southeastern language. Some languages were used in this study which were probably not related to the language of the people at 9Mg28 simply because good data were available. These data were therefore of less use here, but may well be of use to archaeologists in other areas of the Southeast. Unpublished data available in the Smithsonian Institution might have been profitably researched, but this was considered beyond the scope of the present work.

A total of at least five linguistic families are commonly thought to have been present in the prehistoric (or early historic) southeast (Haas 1979:299). These include: 1) Muskogean; 2) Algonkian; 3) Iroquoian; 4) Siouan; and 5) Caddoan. Language families are groups of broadly related individual languages that are assumed to have a genetic relationship. The presence of five separate language <u>families</u> in the southeast is an indicator of the tremendous linguistic diversity present in this area. It should be noted that Muskogean is the only southeastern family present only in the southeast, the others having representative languages to the north and west. To complicate the picture still more, there are at least six so called "language isolates" in the southeast. These are individual languages which have no demonstrated strong relationships with any other historically recorded language (ibid: 300). For the Southeast these include: 1) Atakapa; 2) Chitimacha; 3) Natchez; 4) Timucua; 5) Tunica; and 6) Yuchi. While some of these may be distantly related to one of the five families listed above, their assignment remains controversial at best.

The Algonkian languages were represented in the Southeast in Virginia and coastal North Carolina only. None of these has been examined for this study. Likewise, none of the Caddoan languages, most of which are located on the western periphery of the southeast, were examined for this project. It was felt that both of these families were too distant geographically to be applicable in Georgia. Of the Iroquoian languages, Cherokee is the most important in the South, although Tuscarora in eastern North Carolina was also present. Cherokee was examined in this study. The Siouan languages within the Southeast are Catawba in South Carolina and Biloxi, Ofo, and Tutelo in the lower Mississippi Valley area. Of these, data from Biloxi and Ofo were gathered for this project. Of the language isolates mentioned above, data were gathered from Atakapa, Tunica, and Yuchi.

Muskogean has been left until last because this, the largest family of southeastern Indian languages, requires more discussion than any of the others. Further, this is the most likely candidate for the language family of which the people at the Joe Bell site were a part. Mary Haas (1941, 1979) has classified the eight separate Muskogean languages for which we have some data into two major groups and four sub-groups. The major division of the languages is into Western and Eastern divisions (ibid 1979:306). The Western includes the Choctaw and Chickasaw languages only. These two languages are actually only dialects of one another, probably no greater than the difference in "American" English and "British" English (ibid: 301). The two groups have been politically distinct for some time however. Historically both groups lived in the present state of Mississippi. Mobilian, the most common lingua franca used for trading purposes in the Southeast in early historic (and possibly late prehistoric) times is very closely allied with both Choctaw-Chickasaw and probably was primarily derived from them (Crawford 1975, 1978; Drechsel 1979).

The Eastern subdivisions of the Muskogean languages includes six languages (and/or dialects) divided into three subgroups. These are: 1) Alabama and Koasati, 2) Hitchiti and Mikasuki, and 3) Muskogee proper (often called "Creek" by linguists) and Seminole. The two languages within each of these three subgroups are actually but dialects of one another in much the same way Choctaw and Chickasaw are related. The extinct language Apalachee, for which very little is known, is probably most closely allied with the Alabama-Koasati sub-groups of the Eastern division (Haas 1941, 1979).

Of all the Muskogean languages (not to be confused with Muskogee proper) data for the analysis undertaken here was obtained from Choctaw, Chickasaw, Mobilian, Muskogee, and Seminole. It would have been desirable to obtain data from Alabama, Koasati, Hitchiti, and Mikasuki but usable data in either published or unpublished form were not available. Future work should attempt the location and inclusion of data from these languages, but the lack of data is not considered essential to this study. Speaking of the Muskogean languages (at an early stage of their development) Haas says "Nevertheless, the poles were Choctaw, on the one hand, and Creek [Muskogee] on the other. The other languages were more or less pulled between these two poles" (Haas 1979:306).

## Methodology

Although this chapter is briefer than those relating to the computer analysis of the form of the 9Mg28 ceramic vessels, it represents no less time expenditure in the analysis. The following section describes the way the research was conducted as a prelude to the discussion of the results.

An initial list of published dictionaries was compiled and these sources were obtained. Those obtained included ones for Atakapa (Gatschet and Swanton 1932), Biloxi (Dorsey and Swanton 1912), Cherokee (Feeling 1975; King 1975), Chickasaw (Humes and Humes 1973), Choctaw (Byington 1915); Muskogee (Loughridge 1964), Ofo (Dorsey and Swanton 1912), and Tunica (Haas 1953). While not written as dictionaries, information on Mobilian was obtained from the works of Crawford (1978) and Drechsel (1979). Unpublished material on Muskogee, Seminole, and Yuchi was obtained from Mary Haas, Michelle Nathan, and James Crawford respectively. Unfortunately almost all of the data obtained had been recorded using different orthographies. No attempt was made to put them into a common form, however.

By far the most complete of all these references was that of the Choctaw dictionary of Byington. These data were obtained in between 1819 and 1834 and revised a number of times up until the author's death in 1868. Thus this data set is, in addition to being the largest, also the oldest of those utilized in this study. Because of these reasons greater effort was expended on Choctaw than any of the other languages.

A rather straightforward, but time consuming process was used to extract the relevant information from the dictionaries. An initial list of English terms for containers (starting with jar, bowl, pot, etc.) was created. As matters were to show, the initial list of some 10 to 15 terms was woefully incomplete. These terms were recorded from the English-Choctaw portion of Byington's dictionary. All of the Choctaw words or forms found in this manner were then looked up in the Choctaw-English section of the same dictionary. This often produced references to further English words or phrases not initially recorded. By going back and forth many times in this manner all container words, terms or expressions were eventually recorded. By observing the morphological context of many forms, diminutive and augmentative suffixes were recognized. Many forms were compound. Individual parts of compound forms (i.e. individual morphemes) were eventually recognized, isolated, and identified as to meaning.

It was found that many terms for containers are based upon the material or substance contained within them. This is not really too surprising. Thus it was decided that common items contained (water, food, etc.) would also be recorded. Many of the forms derive from ways of cooking (boiling, frying, etc.) and these were also recorded. Other terms were also occasionally recorded if it was felt their meanings helped the understanding of the containers.

Following the initial completion of data gathering from Choctaw, the updated (and greatly enlarged) list of terms in English was used on the other languages sequentially. When new (previously unthought of) words were found in a source, other sources already analyzed were re-examined to see if the new found terms were present and if so were added to the data extracted from that previously examined source.

Counting all compound or adjectivally produced phrases a final total of 175 English forms were recorded from all eleven of the languages examined. Of these 75 were single English words, the rest were formed in English by the addition of adjectives as descriptive modifiers. No single one of the langauges had all of the terms, either the individual

English words or the compound forms. Many terms were found recorded in only one language. The above counts of English terms and phrases recorded include only terms for containers themselves and not the auxilliary words (water, food, cooking, etc.). The total number of container words and phrases recorded by language are as follows: Choctaw - 99; Muskogee - 76; Atakapa - 45; Chickasaw - 41; Yuchi - 34; Biloxi - 33; Cherokee and Tunica - 25 each; Seminole - 11; Ofo - 8; and Mobilian - 7 forms. This gives a total of 404 forms for containers in all eleven of these languages together. The disparity between the data available is immediately apparent. This is primarily a function of incomplete data recording, although actual differences between individual languages in terms of the full number of native words to identify all of the English expression must exist. For many of these languages it is too late to obtain this data. For others it is not, and future linguistic fieldwork might provide this data to make future analyses of this type more complete.

A few general comments are necessary about the general mode of analysis before the individual languages are discussed. First, for each language, a list was compiled of what were apparently root words or forms (single morphemes or groups of morphemes that never occurred separately within the container words under analysis). Beneath each numbered root form within a given language, all of the forms apparently based upon that root form were listed as a sub-group. For both the root form itself and all of its family of forms the English terms which were found to be represented by the root and its members were listed to the right. This entire process was repeated for each root form recognized within a given language. A few of the separated root forms within a language may have mistakenly been separated, but most do appear to be different in form and ultimate meaning. There was much variation in the number of modified forms present under each root form across all the root forms present within a given language. There were many examples of root forms which had no modified forms recorded, while at least one root (AMPO in Choctaw) had no less than 21 forms present.

Following this step, the many English terms used for each numbered root in each language were collectively examined to determine, if possible, what they all had in common in terms of use or meaning. Although in some cases no logical reason was apparent for the groupings, this usually could be done for those languages with sufficient data. The literal meaning of compound forms (ones that always occur together in this context) often made clear the meaning of the grouping. Forms that could not be broken down further and for which the only available definitions were for a group of containers were considered "old" forms within the language, or else were possibly borrowed from another language. A few examples of borrowings were found in the data set--not really surprising since much of the data was recorded in this the twentieth century.

Finally, a classification was developed from the preceeding analysis based upon groups of basic forms which had a common basic character. Some forms did not really relate to any others and these were simply grouped together under a general category. This final resulting classification may be representative of the way speakers of the given language classified their own containers.

Results

Those languages for which only small amounts of data were available were too incomplete to allow the above outlined analysis to be taken to completion. This is unfortunate, but not unexpected. The data themselves for these languages are included in Appendix J along with the rest of the data for future reference and for sake of completeness.

Choctaw

For this material a total of 20 more or less separate major or root forms were identified. These are discussed individually in this section. Following this discussion a systematic classification of the forms based upon their meanings will be presented. There is no specific order to the following forms, although those that have the greatest number of variations recorded are presented first.

1) ampo - There are 21 different forms of this root present in the data set. The word also means "to eat" and "food" so its area of meaning is specific. A wide range of English terms are equated with it including bowl, crockery, earthenwear, pan, pottery, and vessel. This form thus relates to eating vessels or vessels for serving food. With modifiers it applies to wooden or metal containers, but appears to refer to native ceramic containers in the basic form.

Both diminutives and augmentatives are present. This argues for a three size classification (small, "normal", large). Further, shape variations (flat and curved) are included. The form aiimpa, formed from ampo (impa) + a locative prefix means "place to eat" or "eating place". Thus the food bowl is not a thing per se but a place. This world view is seen in a few other forms and is different from the way we view pottery vessels. Of further interest is the form ampkoa, "broken bowl" formed logically enough from the form amp(o) + the suffix "to break". The term "potsherds" then is formed by reduplication from this form and is ampkokoa, the additional middle "ko" referring to the "many sherds produced when a bowl is broken. There seems to be no term for a single potsherd, but the group of sherds from a vessel is best thought of as a collective noun. Whether or not the collective term (ampkokoa) was applied to a single sherd is unknown.

2) kotoba - There are ten variations for this form. The form itself seems to be a compound derived from the words meaning "to break" + "to make" or thus "made to break". The words referred to by this form all are generally small glass containers for water or other liquids. The descriptive compound meaning certainly refers to the nature of glass containers. Because glass containers are not native and because the form is a descriptive compound we may safely say that the term is not a pre-contact term, but was invented when glass containers first became available. There are compound forms with kotoba to describe the color of the glass containers, most notably green/blue which must be the "green" or "black" glass bottles prevalent in the 17th, 18th, and early 19th centuries. Clear (meaning transparent) bottles are also described adjectivally. The form "lukfi kotoba" or dirt/mud kotoba means jug or jar. This may well refer to the stoneware jars or jugs which became common in 19th century America.

3) shuti - Eleven forms for this root are recorded. No specific meaning for the word can be derived from other Choctaw words and thus it must be considered quite old--probably well into the prehistoric period.

The word is directly equated with English boiler, kettle, pot, and earthen pot. Both diminutives and augmentatives are used with it. The meaning of the form based upon its usage is that of a vessel in which food is cooked, particularly and perhaps exclusively by boiling. Certainly boiling seems to have been the major mode of cooking among most southeastern Indian groups in historic times so the antiquity of this form is not at all surprising (Hudson 1976:300-309). Most of these forms appear to have been earthen (ceramic or pottery) and this further confirms the antiquity of the linguistic form.

4) awaɬalli - This was translated as a boiler or sauce pan. The form literally means "can't splash", implying a special shape, or, more likely, a pan with a lid. It might imply a cazuella form. The emphasis is on the boiling itself rather than on what is being boiled. Diminutives are present, but not augmentatives. The terms may refer to small European pans but this is not certain.

5) aiokami - But two forms were recorded for this compound word. The English translation is wash basin or wash bowl. The form itself is a compound formed from "place" or "location" + "to wash face". Thus the word is for a "place to wash the face (only)" and not about the container per se. The form "ampo aiokami" was recorded. Ampo is "food", "to eat", or "container from which food is eaten" and has no logical connection with "place to wash face". This may indicate, however, that the same container had multiple uses and what it was called depended on its use at the moment.

6) asonak - This form is not a Choctaw term, although its origin is uncertain. The most likely source is from an Algonkian language where it is associated with the meaning "money" (Crawford 1978:72).

The form is also found in Mobilian. Other possible sources for the word are from sixteenth century terms for money and Romani (French Gypsy) terms for gold (Drechsel 1979:74-5). The English forms used with it in Choctaw are for brass or tin European made vessels, pans, pots, or kettles, all fairly small in size. No specific use designation follows from the analysis--either for water, food, or storage, rather the emphasis being on the material (brass or tin) from which the vessels were made.

7) iyasha - The literal meaning of this form is derived from two morphemes, "place where" + "to occupy" or "to be there". Thus it means "place where something is" or "place where it stays". The English use of this form is for large pots or kettles. It appears that the seven forms recorded relate to the heavy black iron kettles commonly located in the yards of most 19th and early 20th century habitations, both Indian and non-Indian. These heavy kettles were generally left in one place and thus the etymology here is meaningful. An alternative meaning is the place where the contents of the vessel stays. Both diminutive and augmentative forms are present. The phrase "shuti iyasha" was recorded (food boiling vessel + "place where it stays") by Byington. Iyasha may be a shortened version of this form. Cast iron pots would be much heavier than their ceramic predecessors and thus less likely to have been frequently moved about. No specific use is assigned by this term for these containers, however, and no indication of the contents is apparent either. Typical early twentieth century uses for these vessels in non-Indian contexts in the Southeast included clothes washing

(boiling) and occasional cooking of large quantities of food for social events.

8) italfoa - This term is used for "kegs" in the simple form. The word is a compound formed from "wood" + "to cut" or more logically "cut wood". One augmentative form exists and is used for "barrel", "cask", etc. Also one diminutive form is recorded to mean "keg" or "small keg". The meaning "cut wood" obviously comes from the individual cut wood staves used by a cooper to make a barrel or a keg. These items are not native and thus the term is in all probability not prehistoric, but was invented to describe the newly introduced items. No specific use is implied by the term itself, although one would surmise that the items were used for storage purposes. No idea of the types of contents put in these containers is presented either.

9) isht ochi - The initial form isht may be best translated "that with which". The second form deals with drawing water. Thus the total form may be translated "that with which to draw water". The many English terms using this form (bucket, can, flagon, pail, piggin, water pot, water pail) all relate to drawing water. The emphasis is on the initial of drawing water from its source, not from storage. Only one other form is present--"Oka isht ochi" which adds the word water (oka) itself to the expression making it redundant, but perhaps used to indicate that the phrase only applied to water.

10) isht ishko - This means "that with which to drink" literally. The emphasis is on rather small items to hold water (or other liquid) for direct consumption by people. A diminutive form exists and is used for "small cup", "tea cup", and "small mug", implying that the normal (non-diminutive) form was slightly larger. This translates as

"chalice", "mug", or "tankard". An alternate form "aiishko" places the emphasis on the "place to" (drink) rather than "that with which to" (drink) in much the same way as aiimpa (place to eat) discussed above under ampo.

11) yaklash - This form is quite variable - five forms were recorded, all of which seem to be different recordings of the same word (yakalush, akuhish, akolas). Probably the form derives from ya, the definite artical "the" + a metathesized version of "lakush--water gourd. The metathesis of k and l seems plausible in this environment. This is further supported when it is realized that the English translation for all these forms is "jug" or "jar". Thus the meaning of this form group appears to center on the storage of water. No diminutive or augmentative forms are present so it must be assumed that the single size used was neither "large" nor "small", perhaps in the vicinity of a gallon or two in capacity, although this can not be certain. The ultimate connection with water gourds might well argue for a smaller size water container. The emphasis, however, is on storing water, not drawing it or drinking it.

12) aiạlhto - This compound form derives from "place" or "location" + "to hold" or "to be in". Thus it is best translated as a "place to hold (something)". In other words, it is a storage container. There is no specification of what is held, although in its unmodified form it probably is associated with non-liquid items. Further, the implication is for that of a medium to large sized container. English terms equated with it are "bin", "box", "canister", "vat", and "vessel". Most of the six other forms add "oka"--water as an initial adjective to specify storage of water (or liquid).

Representative English terms for these are "cistern", "tub", "vat", "trough", etc. Most of these storage containers would have been of wood, but large ceramic (or perhaps even metal) containers can not be excluded.

13) aɬabocha - Only one form is present here, the one given. The meaning related to boiled food and the English translations are "boiler" and "pot". Thus these are food boiling vessels, with the emphasis on the food itself. Material for the vessel and size range evidence is absent.

14) aiachefa - This form is a compound derived from "place to" + "to wash" or "to cleanse". Thus it is a "wash place". The English translation is a wash tub. There is no particular indication of what is being washed, although it is apparently for things other than humans. The most likely candidate is for a wash place for clothes, but this is unproven. An adjective form "ampo aiachefa" is recorded and this may imply a container to wash food (roots, etc.?) before cooking, but I suspect it simply means a vessel normally thought of (by its form perhaps) as a food vessel being used as a container for washing. A third form--"nan aiachefa" is also recorded, with the initial form meaning "a thing". The translation for this is also a washtub. Whether an "aichefa" was generally of wood, ceramic, or metal is not clear.

15) isht takafa - The meaning of this compound is "that with which" + "to dip up". The English translation, logically, is "a dipper". Two other slightly modified forms are recorded, but the meaning is consistent. The items are generally small and are used apparently to get water (or liquid) from storage for use (but apparently not

for immediate consumption). Different forms are used for drawing water from its source and for drinking water so this represents an intermediate step. It also may represent a laddle for serving soup or stew from a large cooking vessel to eating bowls.

16) apalaska - This is probably formed from "place to" (contracted) + "to bake", thus "a place to bake". The English translation however is a "griddle" or a "frying pan". Since one does not usually bake in these (except for cornbread) and baking was not apparently done prehistorically (no enclosed ovens) the phrase is somewhat confusing, particularly with reference to "a place". The place apparently refers to the container in which something is baked and not the place where the container with its contents are baked. There is no indication of what material these containers would have been made of, but it, of course, would have been of either ceramic or metal.

17) mahaia - This means "bowed" or "curved", an apparent reference to the shape of the particular container in question. The English representation for this form is "kettle". The form is also found in combination as "shuti mahaia" - "curved food boiling vessel" and "ampmahaia" ("ampo" + "mahaia")--"curved food eating vessel". What specific vessel form implied is uncertain, but perhaps it refers to small to medium size rounded cast iron kettles used for several purposes. It is probably not an aboriginally used term for a container, but was a descriptive term applied to a newly introduced form.

18) aiyupi - This compound is formed from "place to" + "to wash body", thus "a place to wash the body". It is most interesting to note that a separate form is used to denote a container (emphasis again

place rather than the container itself) for washing the body as opposed to the face or anything else. The English translation supplied is that of a "laver". Since the face-body distinction does not appear to be significant for purposes of washing within the English language, the translation is not too good because a "laver" can also be used to wash the face. The face/body distinction in relationship to cleansing may have been significant in terms of the belief system of the people, particularly given the significance attached to ritual bathing in most of the southeastern Indian groups (Hudson 1976:128, 132, 317-18, 322, 324-9, 337-8, 344, 355).

19) kishi - This literally means a "basket" and is so translated. There are no variations recorded (even though there must have been baskets of different forms) except for the totally distinct word TAPAK which also means "a basket". The difference between the two is unknown and no indications of size (diminutive or augmentative forms) or of the variable nature of the content. A basket was just a basket.

20) shapo - This form means "luggage" or "a pack". It may be a borrowed word as no other forms were recorded and no derivation seems apparent. There are no other forms of it recorded and no size distinctions made.

Based upon the above data, the container terms in the Choctaw language can be divided into five categories. There are terms relating to: 1) water (liquid); 2) food; 3) storage; 4) washing; and 5) general purpose.

For the first of these categories, water (or liquid), a total of 31 linguistic forms were recorded and can be broken down as follows. Two terms were used for "to draw (water) with" (from its source--well or river). Five terms were recorded for "to store (water) in". This, of course, can also be listed under storage. A total of four terms were recorded centering on containers used "to draw (water) from storage in". Seven terms were recorded centering on the meaning "to drink with". All four of these form-meaning groups were probably aboriginal in origin. Two forms are probably not aboriginal. These include: 1) glass bottles (for holding liquids) for which no less than ten linguistic forms were recorded, and 2) small boiling pan for which three linguistic forms were found.

A total of 36 terms were recorded relating to food containers. The most common of these (with 21 forms recorded) were containers designated as serving or eating vessels. No apparent distinction was made in these two groups (serving and eating) probably because everyone's eating containers were probably filled directly from the cooking vessels. The second most common container form (with eleven terms recorded) was for food boiling vessels--probably of large ceramic form. One other term was recorded for a food boiling vessel, but with specific emphasis on the food being cooked. All three of the above forms are probably aboriginal in use. Two other terms relating to food may or may not be aboriginal. These include: 1) two terms for frying or baking vessels, and 2) a single term for curved (iron?) kettles.

The third major category of container terms in Choctaw relate to their use for storage. A total of 15 terms were found here divided into three groups. The most common of these (seven forms recorded) are medium to large storage containers for liquid or dry (non-liquid) items. This term may have been more commonly used for non-liquid items because another term (with five forms recorded) is specifically used for reference to liquid (particularly water) storage. This term is also lised above with the first category discussed (water). A liquid-non-liquid storage distinction is implied here, but it is apparently not universal. A third category of terms for storage (three recorded) are wooden barrels and kegs. These terms are undoubtedly not aboriginal since there is no evidence that these items were present before being introduced into the Southeast by Europeans.

The fourth category of vessel use is for washing. All of the six terms in three categories recorded here appear to have been aboriginal terms. Further all of them have the emphasis on the containers as a place where washing occurs rather than on the containers as reservoirs for washing water. Two forms were recorded for a place to wash the face, one was recorded as a place to wash the body, and three were recorded as a place to wash anything else. While these terms are here applied to the containers, it is not known if the same terms were applied if washing took place at a water source itself rather than in water in a vessel. The emphasis on "place" however, suggests that this may have been possible. As pointed out before, the face-body distinction may reflect some aspect of their beliefs.

The final category of container terms recorded is that of "general purpose". Actually, this may be a little misleading in that most of these 17 terms have no indication of what is contained or to what specific uses the items for which they stand were put. Of apparent significance in this category's definition is the fact that almost all of the terms

(15 out of 17 terms, or four out of five groups) are probably not of aboriginal origin or use. The first group of vessels included here are vessels that were probably of the common black cast iron type in general use in the 19th and early 20th centuries throughout the area by both non-native and native Americans alike. It is easy to understand why these rapidly replaced ceramic vessels for many containers, especially boiling and cooking vessels because of the much lower breakage rates of the iron vessels. Certainly they would have been more expensive to obtain, but their superiority over the long run would have been well worth the expense and most Indian groups probably readily adopted these for use in cooking. A total of seven linguistic forms were recorded which probably deal with these vessels.

Another group of general purpose vessels linguistic forms recorded (six words or forms) also made reference not to the contents or use but the material from which these newly introduced vessels were made--that of brass or tin vessels, the former being the most common probably. Most of these vessels were smaller than the cast iron vessels and were used apparently heating or storing smaller quantities. These came in a variety of sizes, however, and the larger ones could have been used as family cooking vessels. One term is recorded which means a pack or luggage--that is a flexible cloth or leather container to be used in travel. While this term may be aboriginal, it may also be borrowed. A single recorded term meaning "curved" or "bowed" may imply round a cast-iron vessel but this is unclear. It does not appear to have been used to describe a vessel form found aboriginally however, but rather seems to be a descriptive form applied to a newly introduced item.

The final "general purpose" container group recorded is that of baskets. While two separate words were used for baskets, neither tells us anything about what uses different baskets were put to. Certainly baskets must have been present aboriginally and these two terms must also have been aboriginal.

In review of the Choctaw container terms a number of points should be made. First it is clear that it is difficult or impossible to derive or know what the specific shapes of vessels assigned to particular terms would be. While there may be limitations put on vessel shape based upon the intended use or uses, this information is not present per se in the linguistic data. Second, there is no mention of or implication that the decoration or lack of it for containers played any part in the terminological system for their containers. Apparently decoration used either for identification, aesthetics, or beliefs was not coded into the language in any form. Neither was vessel quality. The two most important terms, both of which were in all likelihood aboriginal, were AMPO --vessels for serving or eating and SHUTI--vessels in which to boil food. Both likely refer to pottery containers. There were size distinctions within both of these forms--small, "normal", and large. None of the other terms applied to aboriginally present items have all three size classifications recorded. A "normal" SHUTI was, in all likelihood, larger than a normal AMPO. It is tempting to equate the SHUTI with the excurvate rim "jars" and the AMPO with the incurved rim "cazuella bowls" found archaeologically, but this is not really testable and must be left at that for the present. It is interesting to note, but is not really surprising, that by the time Byington recorded his data in the early part of the 19th century, the container vocabulary of the Choctaw had become highly modified, primarily through the creation of many descriptive compound terms, by the availability and use of many non-native container forms. This in itself should cause much concern over the usefulness or validity of data for the other languages which were recorded later in the nineteenth even the twentieth centuries. While old terms for formerly used ceramic containers may be present, more descriptive compound forms probably are present than original terms. This would be even more evident as the art of home ceramic manufacture was finally abandoned by the people.

Muskogee

The next language to be examined here is Muskogee proper or "Creek" as it is often termed. The latter name is to be avoided here because of the confusion it generates with respect to the Creek Confederacy which had members from many different Muskogean and even non-Muskogean languages.

The data for this work was primarily recorded by Loughridge, another nineteenth century missionary. His dictionary, while certainly a valuable source for this project, is neither as complete as Byington's work nor as usable for this project. While a total of 78 container forms were recovered from this (and from unpublished work by Mary Haas), the forms are not as easily organized as were the Choctaw forms. At least three possible reasons for this exist. They are: 1) Muskogee container terms are in fact not as logically organized, 2) Loughridge was not as competent or dedicated recorder of language as was Byington, or 3) Loughridge, who was somewhat younger than Byington and began his work much later, was at the disadvantage of recording a language which was less intact than was Byington's Choctaw. I believe the latter two of these reasons are more likely to be the explanation for the problem than is the first. The implications of this are that less emphasis should be placed on understanding the container classification system in the Muskogee data than on the Choctaw.

The 76 Muskogee linguistic forms recorded can be grouped into 27 groups. I hesitate to call these roots, for analysis of these data is more difficult. Some are roots. Some are compounds which are consistently found together. Fewer literal meanings were deducible. While this might be taken to imply that there are more "old" terms in the list, I believe that a more likely explanation is that if more data were available many of these could be understood directly as was the case with Choctaw. The following section discusses the data by form similar to that done for Choctaw.

1) palakna - There were 17 variations on this form, more than three times as many as for any other single form. No literal meaning was discovered, but it must relate to food. The English terms most used are "pan", "plate", "bowl", and "dish". Both diminutive and augmentative modifiers were recorded, as well as shape modifiers meaning "deep" in one instance and "flat" in another. All terms seem to imply eating and serving vessels rather than cooking vessels.
2) sésketv - This form is translated as "mug", "cup", or "tumbler" and apparently means "to drink from or with". Five forms were recorded including both augmentative and diminutive forms. The augmentative form is translated "bowl" which does not imply a cooking vessel however.

3) móreckv - The five forms found for this came from the verb "to fry" --thus these are vessels used to fry food. Indeed the most common translation is "frying pan". Diminutives were present ("small frying pan") but augmentatives were not. The reference here may be to the still commonly used black cast iron frying pans, but this is uncertain. Vessels of this shape were not a part of any prehistoric southeastern Indian ceramic assemblage and it is even doubtful if frying as we know it was used to prepare food prehistorically in this area.
4) aṙkáswa - There are five, perhaps six, forms of this root present in the data. They all apparently refer to ceramic containers, probably used for cooking, possibly the boiling of food. English forms are "clay pot", "pot", "kettle", "earthenware", and "sofkee jar". Neither diminutives nor augmentatives are recorded. This form seems to be the most likely candidate for the original term for ceramic cooking vessels.
5) acúnkv - This group has five forms all of which imply the storage of water in fairly small quantities. The English terms used are "can", "water pail", "water vessel", "pitcher", "pail". They are apparently not for drinking from, but are used as intermediate liquid storage. No literal meaning was found and no size modifiers were recorded.
6) fvlásko - This is probably directly borrowed from English "flask" which is one of its translations. Other translations are "bottle", "jar", and, in the diminutive (fvlaskucé) a "vial". Thus the general meaning for this non-prehistoric term is that of a water or liquid container, probably made of glass.
7) hálo - The three terms recorded here apply to "drinking up", "tin cup", "bucket", or simply "cup". In combination with Form 1 above,

the meaning is translated as "tin pan". Thus it appears that the term has reference to metal containers, probably tin, used for containing liquid usually. The term itself may be borrowed, but this is not clear.

8) towvnvke - This literally means "tied-wood" and is used as a descriptive compound to mean a barrel. In the diminutive form it means keg. The description is an apt one in that a barrel is found by strips of wood (staves) "tied" together with iron bands (hoops). The linguistic form probably was not used before European contact. No specific use is assigned to these items by the data here.

9) sakkv - Only two forms are recorded for this and the translation is "basket" or a "non-water vessel". No literal meaning is recorded. Whether the similarity to English "sack" is real or specious is unknown. There is another word for "basket" (discussed later) and the word "fulasko" above appears to have been borrowed so it is possible that this also is a borrowing.

10) caukv - The four terms recorded here all relate to obtaining water. English translations include "dipper", "laddle", "bucket", and "pail". Thus it appears that this term is used to indicate both a container used to obtain water from either its source (well, river, etc.) or from temporary storage.

11) fípí· - This is literally a gourd. There are three forms, but all are translated the same. These were generally used as water dippers, but certainly could have been used for any scooping activity. No diminutive or augmentative forms were recorded.

12) ca·ɬkasláni - The three forms recorded for this group are all translated as brass or copper kettles. It probably is a compound form,

but the literal meaning was not deduced. With the emphasis on the metal from which they were made, the terms are certainly not aboriginal. These were apparently medium sized vessels probably for cooking.

13) lihá·ya - The three forms of this all seem to be large containers, perhaps of iron. The English translations are "iron pot", "kettle", and "pot". No literal meaning was discovered. It is possible that the word was not used before European contact, but this is uncertain.

All of the remainder of the list of Muskogee container terms which follow have but one recorded form.

14) mutésv - This is translated "jar" or "jug" probably for holding liquids. Nothing else was found out about this form.

15) pēcv́ - Translated as "pitcher", it seems likely that this form is thus borrowed from English. It, therefore, is not an aboriginal term.

16) natvrkv - This is possibly a root plus an augmentative ( akko = rkv), but the meaning of the root was not found. The English translation is "chamber pot" or "earthen pot". The use of a chamber pot is not aboriginal, but this meaning could have been supplied to an existing term. The use of the term to mean earthen pot may indicate some time depth for the term.

17) sampa - This means a "basket". There are no variations and the term probably is an old one. No specific use designation is apparent.

18) lúcuwv - This is translated as "jug", a probable water container. No hint of its literal meaning was recovered.

19) tepoku - Translated as "bottle", no literal meaning was found for this form. The probable meaning is a glass container for liquids

however.

20) es-éssétv - Literally this means "that with which" plus a root of unsure meaning. The English translations are "container", "vessel", and "vessels". "Essetv" may be a modified form of "sesketv" (Form 2 above) which means "to drink from or with", but this is uncertain.

21) catahâyya - This means "iron that heats" and is translated as "stove". The form is a thus a compound descriptive one probably used to refer to a black cast iron, wood burning cooking/heating stove.

22) elle-oca - The first part of this form means "foot". The literal meaning of the second half is unclear. The English translation is simply "pot". I believe that this refers to a "pot" with feet. The most likely item referred to here is a black cast iron pot or kettle of the type with feet--usually three in number. No specific use is designated.

23) vtéhkv - This is translated as a vessel not used for water (or probably any other liquid). The specific reference is unknown. Further it is not certain whether this term pertains to containers which simply were not used to hold water because they were not capable of doing so (such as a basket or cloth bag) or if it refers to vessels which could have held liquid but were not used in that manner. The former seems most likely.

24) icha·skałwa - This means "gun" plus possibly "pot". The English translation is "brass kettle". The reference to a gun is confusing. Two possible reasons are: 1) these vessels were used to melt lead for making bullets, and 2) the brass or metal from which the vessel is apparently made may be analogous to brass or metal seen on guns.

Neither of these reasons seems very sound and the form is basically not understood.

25) rē-esrekkickv - This is translated as a laddle. The literal meaning of the apparent compound form is unknown and little more is known about this form.

26) 'sisk-ita - This is possibly related to Form 2 above--sesketv--which means "to drink from or with". The English translation for this form is "cup", thus providing a second bit of support to the connection. For purposes of this analysis, however, it is left separate.

Analysis of the above data indicates that the forms are not as organized into as meaningful a classification scheme than were the previously discussed Choctaw data. There are, however, broad and generally similar patterns present between the two.

Muskogee certainly includes the food and water container categories as separate and distinct categories. A total of 28 forms are attributed to each of these two. The category of storage containers was also represented, but not as commonly as in Choctaw. No specific terms were found in Muskogee for washing containers. This is in contrast to Choctaw where a three part system emphasizing place and item washed was present. The last or "general" category is larger in Muskogee than Choctaw. This probably reflects the later date for the gathering of the Muskogee data with the resultant increased loss of native culture.

Within the category of food related containers, there are separate terms for serving/eating containers and vessels for cooking food. This usually meant boiling. A separate category was used for frying just as in Choctaw. As in Choctaw separate forms were present to separate among containers used for: a) getting water from its source, b) storage of water, and c) drinking from. There appeared to be more container terms borrowed from English in the Muskogee data, again attributable to the later recording of the data. The increased number of linguistic forms specifically referring to non-native containers (metal and glass for example) also supports this contention.

Chickasaw

As pointed out earlier, Chickasaw is but a dialect of Choctaw (or Choctaw is a dialect of Chickasaw depending on how it is viewed). A total of 41 forms were recorded for Chickasaw in this analysis. These are broken into 19 separate categories, all but four of which are represented directly in the previously reported Choctaw analysis. These 15 will not be repeated here. The complete data set is listed in Appendix J. The four additional forms, however, are recorded here.

1) palussa - This word literally means "flat". The English translation is "pan". The Chickasaw form here is probably an abbreviated compound form, the other portion of which would have been a container term understood by the people. What that specific term was is unknown, although the form "sonuk palussa"--literally "tin or brass" + "flat" and used to mean "tin (or brass) pan" is recorded. For more information about "sonuk" see the discussion in the Choctaw section above with reference to "asonak". "Umposhi palussa"--"shallow small dish" is also found in the data.
2) ahalhponi - This is formed by a locative prefix "a(i)" plus the verb "to cook" thus the literal meaning is "place to cook". The English translation provided is "vat". No indication of what this container

is made of is indicated, but I would guess it is metal. The Chickasaw data were gathered quite recently. It is interesting to note that the concept of "place" where something is done which was important in Choctaw is also important in Chickasaw.

3) oka aiyuka - There are two forms of this but the second form differs only in the absence in the spelling of the "i" in the second form. The literal meaning is "water" + "place where" (locative prefix "ai") + "captured or controlled". Thus the literal meaning is "place where water is captured". The English translations are "cistern" and "tank", both of which imply water containers of large size.
4) pakali yukli - This is probably related to the form just listed but is recorded here separately. The English translation for the entire form is "vase". The first word means "flower", while the second is a form of "to capture". Thus a "flower" vase literally means "flower captured" or "captured flower". The idea of a wild thing such as a flower being "captured" and held by a vase gives some insight into the different world view of these native Americans.

Beyond these differences which are relatively minor and which may well also be present in Choctaw but were not recorded, the rest of the Chickasaw container data appears not to differ in use classification from that outlined above for Choctaw. This is not too surprising given the close relationship of the two languages.

Mobilian

This is not a separate language per se, but was used as a "lingua franca" for trade throughout much of the Southeast in historic times (Crawford 1978, Drechsel 1979). It was derived primarily from Choctaw with additions from a few other languages. A total of only six container terms were recorded for Mobilian. Four of these are terms that are duplicates of forms already reported above for Choctaw and no new information is recovered. Two terms are discussed here.

1) šošekoše - This is reported by Drechsel to mean "gourd", implying perhaps a gourd container. The term is not Choctaw and Drechsel (personal communication) believes it to be possibly a term from an Algonkian language.
2) tapak keše - This form, also reported by Drechsel, is translated meaning "basket". In fact, this form is a combination of two apparently separate Choctaw words, each of which means basket by itself. These are "tapak" and "kishi", both of which were discussed above with the Choctaw data. The redundancy of the Mobilian term is not completely understood.

Given the paucity of Mobilian data and the close ties of it with Choctaw, nothing new about container classification is gained here. Any inherent classification scheme for containers would in all likelihood, have been quite similar to that for Choctaw discussed above.

Seminole

This is the last of the Muskogean languages for which data was gathered for this project. A total of only eleven terms was available. Seminole is a dialect of Muskogee and many similarities were evident. All but two forms had comparable forms reported above with the Muskogee data. Analysis of these two additional forms are as follows.

1) snoɬéycka - This is derived from the verb "to cook" and must therefore mean a cooking vessel or container. The English translations

are "pot", "pan", and, surprisingly, "stove". The latter translation is difficult to understand except in terms of a conclusion that the Seminole term does not really imply a container itself, but, rather, places an emphasis on "place" where cooking takes place. This is quite possible in view of the importance of this concept in other Muskogean languages.

2) hásakí·ɬka - This container term is somewhat different from all the others reported in this study. The English translations include "drinking glass" to be sure, but also includes the concepts of "measure", "clock", and "watch" (also meaning a time piece). The word is a compound, the first part of which means "sun" or "month" and the second part of which means "found out" or "knows". Thus the concept literally deals with knowing or measuring time. This explains the references to clock and watch. Apparently the idea of "measuring" was transferred to glass (?) containers, which probably were "measuring cups" for determining volume. The transference to "drinking glass" appears to have been the last element in this logical sequence. In any event the phrase is probably not aboriginal.

The Seminole data, as with the Mobilian data just discussed, are insufficient to modify the classification scheme, such as it was, for container terms presented for its sister language Muskogee discussed above.

The two Siouan languages examined, Biloxi and Ofo, will be next examined. It should be kept in mind that these are less important analogical sources for this project than the Muskogean languages.

Biloxi

This language is examined first because more data were recovered for it than from Ofo. A total of 33 linguistic forms relating to containers were recorded for Biloxi. These can be arranged into nine groups of terms and are discussed individually below.

1) mǔsǔdá - A total of twelve forms were recorded under this group. The term apparently covers a much larger area of meaning than any similar term in the Muskogean languages examined above. I should point out that very few of the Biloxi forms allowed discovery of their literal meanings and so they must be derived from their English translations only. For this term the English terms include "bowl", "dish", "plate", "pitcher", and "cup". Thus it appears that the term applies to both food and liquid (water) vessels. Diminutives are present. All of the forms appear to refer to earthenware containers, perhaps of native origin, but this is uncertain. Understanding of this form is further complicated by the next form also.

2) kdopká - This form is translated as "bowl", "dish", "deep dish", and "soup plate". A single additional form combines form one above with this form to mean "earthen bowl". This would imply that term one above emphasizes "earthenware" while term two here does not. While this term, then, may not be of earthenware, there is no real clue of what it is made. The English translations parallel those of number one above except for the lack of "cup" and "pitcher", both terms for liquid containers. Again, the literal meaning of this form is unknown.

3) $so^n$ - The translations for this form, a total of six variations of which were recorded, include "jug", "pot", and "kettle". While a jug

is generally used to store liquids, the latter two terms imply cooking vessels. All would probably be larger than those items in the first two categories above, which appear to be more related to items from which to consume (solid or liquid).

4) i$^{n}$ - This literally means "to drink" and is logically translated as "cup". A total of four forms of this were recorded and included forms to mean "tumbler" and "tin cup". It is thus surprising that with this term available to mean "a container with which to drink, the term "mŭsŭdá" above also is translated as "cup".

5) tŭpí - The translations provided for this form are "bucket", "pail", and "tub". The first two of these terms imply the use of containers for obtaining water from its source, while the latter is commonly used as a receptacle for water (for storage or washing). No literal mean was recovered. A total of three forms were recorded using this form.

6) konická - The three recorded forms of this are translated into English as "bottle" or "jug", both meaning a container used to store liquids in medium to small quantities. This is one of the few Biloxi terms which can be interpreted so straightforwardly. No indication of the literal meaning was recovered however.

7) yĕskasa̋ - This was a single form recorded which was translated as "tin pan" and "tin or pewter plate". The emphasis is thus on the metallic nature of the item precluding it from being an aboriginal term. Although it probably is thus a descriptive compound, the literal meaning is unknown.

8) xap - This single term is translated as "box". While it must be assumed that this is a wooden item, even this can not be sure.

Whether the translation is literal or not is not known either.

9) a$^{n}$ taska - This term was translated as "basket" and is the only form so recorded. It probably is aboriginal since all indications are that baskets were present aboriginally throughout the Southeast. No specific use is implied by this term.

The classification of the Biloxi container terms is not particularly clear, but some patterns are evident from the above data. Separate terms appear to be present for containers used: 1) to get water from its course, 2) to store water, and 3) to drink with. This parallels the pattern seen in Choctaw above. Classifications of containers used for food is not as clear, particularly in reference to the mŭsŭdá - kdapká problem discussed above. No terms are present for washing containers per se and no general storage container terms were recorded. As always, a totally separate term is provided for baskets. Metal containers are also separate as was the case in the other languages.

<u>Ofo</u>

Although Ofo is related to Biloxi linguistically, there is little similarity between the two with reference to container terms. This may be a result of the paucity of data on Ofo, however. In any event, a total of eight terms were recorded from Ofo. These are grouped into seven separate groups--only one of the terms having a companion form. Only one of the forms permitted a literal interpretation. The seven term groups with English translations are listed below.

1) ashópi - cup - literally "to drink"

2) táblokǐ - bottle

3) tcotkukû́so - bucket

4) amố^n^fi - pot, pottery (possibly iron?)

5) tácka - plate

6) takíska - box, trunk

7) atuphố^n^tuska - basket

The only point of similarity to Biloxi discovered is the final portion of number seven, "basket" which is quite similar (see above). The three part liquid (water) categorization is present, even if only one form each was recorded. Forms 4 and 5 probably reflect a separization of food containers for "cooking in" versus "eating from". As with Biloxi, separate terms are present for "box" (and trunk) and "basket".

The next languages to be examined are the language isolates for which data was recovered. These include, in order of presentation, Atakapa, Tunica, and Yuchi.

<u>Atakapa</u>

A total of 45 linguistic forms were recorded for this language. These form twelve groups, two of which may actually be the same. It was possible to determine the literal meanings for more of these than was possible in Biloxi or Ofo.

1) cixt - This is the most complicated term found in Atakapa container classification because it covers such a wide range. It comes closer to meaning simply "container" than any term in any of the other languages analyzed thus far. The list of English terms used as translations for the 20 forms in this group include "bowl", "dish", "plate", "pot", "kettle", "basin", "bucket", "pail", "pitcher", "jar", "goblet", and "tumbler". Thus the term is used for food

preparing vessels and food eating vessels, as well as water obtaining, storage, and drinking vessels. Although diminutives are not present, shape adjectives are present in the list of this group of forms. Included are modifiers meaning "flat" (used also to mean bowl, dish, plate, and pot), and "long" (used to mean dish). Augmentatives are present and translate as "large bowl". Wooden and metal (iron?) adjectives are recorded and affect the translation as such. Thus it would appear that "cixt" refers to a ceramic container and probably is an aboriginal term. It should be mentioned that the exact form used here is strongly conditioned by the linguistic environment in which it is found.

2) ăm - This literally means "to drink" and is translated as "cup", "drinking cup", and "dipper". A "pottery cup" is formed linguistically by the addition of adjectival forms, thus this form, particularly because it also means "dipper" may well refer to a gourd form, a probably common use in the Southeast. A total of 6 variations were found for this group.

3) ckōp - This form may be the same as Form 4, which follows. The English translations provided include "cup", "bowl", and "dipper". A total of four variations are present.

4) kapō - This is translated simply as "cup". It is possible that the term is borrowed directly from English, but this is uncertain. A total of three variations were recorded. The form is possibly related to Form 3 above. The apparent meaning is that of a small container from which to drink.

5) kĕlakuā́ts - The three versions recorded for this form all are translated as "bottle", a storage container for liquids, in this case

probably made of glass. The literal meaning of the phrase, which may be a compound form, is unknown.

6) itsai - This literally means "to fry" and the English translation is, logically, "frying pan". Two forms were recorded within this group. Whether these are native containers or not is unknown.

7) pāl - The literal meaning of this single term if "flat". It is translated into English under a variety of terms. These include "bowl", "dish", "plate", "pot", and "jar". The term is often found coupled with "cixt" (ten occurrences) or one of its variations and in such cases is translated the same (see number one above). This tends to indicate that the term as used here is an understood abbreviation for the longer form.

8) lu - The meaning of this is literally "mud" or "dirt" and is translated into English as "pottery". It appears thus to be a generic term with no particular shape or use categorization. It was found in combination with at least one other form--lúitka ǎ́mce which means "thing to drink with made of pottery (mud)" and is translated "pottery cup".

9) nec - This form literally means "tree" and also "wood". The English translations are "bucket" and pail", both containers made from wood. These were generally used to obtain water from its source. Wooden containers were widely used for this purpose because they were relatively unbreakable (compared to a ceramic container) and were cheaper than comparable sized metal containers.

10) kau-kau nãutne - Literally meaning "water" plus "to keep in", this container term was translated as water tub. Thus a storage container

for water of moderate to large size is implied. The term for water, kau-kau, may be onamatopoetic.

11) teyó - The literal meaning for this is unknown. English translations provided for this single form include "box", "chest", "trunk", and "valise", all of which are used for storage of non-liquid and probably non-food items.

12) ko - This is the Atakapa word for "basket". As with many of the other languages studied here, only a single form is recorded and no specific use designation is apparent.

As with several of the other languages Atakapa separates vessels used for water containment into categories of: 1) those used to get water from its source, 2) those used to store water, and 3) those with which to drink. Vessels used for food, either for preparation, storage, or consumption from apparently are _not_ separated in their classification. Baskets, as always, are separated by themselves.

Tunica

Only 25 terms were recorded from Tunica relating to containers. These can be grouped into 13 classes or forms. These are discussed below as with the other languages.

1) kohina - This is translated as "cup" or "clay vessel". With an suffix meaning "flat" added, the translation is "dish". With a suffix added meaning "deep", the resulting form is translated as "bowl". Finally, with a prefix meaning "earth" is added, the translation is "pottery". The last form is confusing because one of the translations for the simple form given above is "clay vessel". In general, however, the term appears to be used for food containers

and possibly drinking vessels, an unusual combination. A total of five variations were present.

2) čéhkini - This form is one of the most interesting in all of the linguistic data presented here. The term is, in general, used to refer to iron pots and kettles probably used for boiling food. The literal meaning of the phrases, however, is "crawls on all fours". The reference is apparently to the short feet present on most iron kettles used to hold them upright. A diminutive (literally meaning "to strike together" i.s. to shrink proportionately) suffix is recorded with the form and is translated logically as "small pot". Likewise, an augmentative suffix is present and the resulting compound is translated "kettle"--a larger vessel. The form is generally prefixed with a form meaning "foot" providing further reference to the vessel supports from which the name of this non-aboriginal term was derived.

3) póluhki - This is used to mean "bottle", a probable glass container used to store liquids. Two additional suffix produced forms were recorded to indicate shape as either "round bottle" or "square bottle". These two physical bottle types would have been available to them from quite early in the contact period, the round ones being wine or brandy containers and the square ones being "case gin" bottles. The literal meaning of the basic term is unknown.

4) wíšita ʔeri - This is a three part compound meaning "water" plus "agent" or "thing used" plus "to lift up". The English translations of the single recorded term are "water jug" and "pitcher". The meaning, then, centers specifically on the movement of water from one

place to another. This is somewhat different from the view in Choctaw for instance.

5) kɔ́ramáša - This is a two part compound. The first part means "to drink". The second part is not so clear but may mean "to build or construct". If this is true we may combine the two concepts to mean "something made to drink with". The English translations provided are "glass" and "tumbler", both of which support the above interpretation. A second form with an augmentative suffix is also present in the data. It is translated as a "large tumbler". These linguistic forms are the only terms found meaning "a drinking vessel" in the data set other than the one use of term one above as "cup".

6) láskukéni - This is translated as "bucket" or "pail". No literal meaning was discovered. A single alternate form with an augmentative suffix was recorded and translated as "big bucket" logically enough. This term then must apply to items, probably wooden, used to get water probably from its source.

7) rihkuméra - This is a two-part compound form. The first part, rihku, means "tree" or "wood". The second part is unknown. The English translation of the phrase is "barrel". Thus this is a wooden storage container.

8) ríhkuwóhku - The first part of this two-part compound means "tree" or "wood" just as in the previous form. The second part means "cover with a lid". The English translation provided is "box". An alternate form with a diminutive suffix is translated as "little box".

9) kafi ta mašu - This is a three part form. The first is a borrowed term meaning "coffee". The second is "agent" or "thing used" (see

Form 5 above). The last may be "to build" or "to construct", but this is not certain. The provided English translation is simply "coffee pot".

10) lɔ́hka - This means "basket". No alternative forms were recorded.

11) šuhkali - The translation provided for this single form is "gourd". It is given here because these were usually used for containers of various sorts.

12) ʔáyiri - The literal meaning of this two-part compound is "fire" plus "house". The translation provided is "stove". The reference is apparently to black cast iron, wood fed stoves which were common in the 19th and early 20th centuries.

13) pušihki - This means "spoon" and is possibly derived from the words for "mussel shell", which were probably used in just that manner prior to the development of wooden and metal spoons.

Although the amount of data here are not great, a few comments on the classification can be made. As with several of the other languages, a number of different words are used for water containers depending on whether the items are for getting, storing, or drinking water. But one term (Form 1) appears to have been an aboriginal term referring to food related containers and even this could be used for water containers. A number of terms are descriptive compounds used to describe items introduced from the outside (metal and glass containers for example). As with the other languages a separate single form was used for baskets.

Yuchi

There are a total of 34 forms recorded for Yuchi containers, here arranged into 15 groups. Greater attention has been paid to the proper phonetic recording of words from informants by Crawford than by any of the other researchers of the other languages. This attention to detail, however, required the use of many symbols and diacritical marks not used in any of the other data sets reported here. While these are necessary to accurately record the exact sounds they make, many of the terms are very difficult to read. Further, the Yuchi data recovered here do not show a scheme of container classification that is radically different from the others outlined above. For both of these reasons the specific groups are not listed here but the overall data are included in Appendix J.

In lieu of the usual listings, however, some summary statements can be made. The form with the greatest number of variations (13) is translated "bowl". The modified versions of this form include translations including "plate", "dishes", "clay bowl", "wooden bowl", "coffee cup", "barrel", and "stove". This form, then, has a wide range of meanings produced by adjectives which covers most of the major use categories. Specific individual terms are included in the Yuchi data for "pottery", "bottle", "basket", "box", "bucket", "gourd", "dipper", "spoon", and "drinking glass". Additionally, separate terms are used for "kettle or pot" and "frying pan or skillet".

The Yuchi data are probably the most recently gathered of all the data and thus reflects a language which had undergone the longest period of contact with Europeans (Americans). Further the data were gathered from a few remnant speakers who did not still routinely use the language. Thus it is not too surprising that the container classification scheme is not too clear.

Cherokee

Although there are a large number of Cherokee speakers still alive, the available word lists are relatively small. Although two separate "dictionaries" are available, neither is particularly extensive. A total of only 20 terms were gathered from Cherokee sources for this project. These are grouped into 16 separate groups, indicating very little variation in terms. All but one of the groups are single terms. Many of these terms are probably descriptive compound forms, but, with the limited data available, it was not possible to discover the literal meanings of any of these forms. Ironically, more grammatical information is available for Cherokee than most of the other languages here studied. One of the fascinating discoveries of this grammatical work (King 1975) was the presence in Cherokee of a distinctive classification scheme for nouns based upon different physical characteristics of the item itself. The only example of the use of this system in this data is with the first form listed below and the classifiers are explained at that point. Understanding of any classification scheme beyond this is very difficult with the limited data at hand.

1) kahlv·tohti - container for flexible items
   kahlatistohti - container for rigid items
   kahlthanv·tahti - container for found items
   atsi/hstohti - container for liquid items

These 4 forms, all translated into English as "container", vary in form depending on the item contained. All four forms were recorded only for this English term, and it is difficult to decide to which, if any, of these categories each of the remaining terms in this study belong. This four-part classification system is probably poorly applied to containers, since "flexible" and "rigid" items are not often put into containers. The container form for "liquid" would have probably been the most commonly used form aboriginally.

2) ku·ku - This means "bottle" or "vial" and thus refers to a small glass container for liquids.

3) katakuka - Translated as "jug", this probably represents a stoneware liquid container, but this is uncertain.

4) kalv·ʔna - This is translated as "goblet", a large drinking container. It is also translated as "gourd". The probable original use, as gourds were apparently commonly used for drinking containers in aboriginal times.

5) thalukiski - This is translated as "bucket" or "tin can" and apparently is used to mean a medium sized vessel probably used to get water from its source (well or river).

6) uknawa - This translates as "dish", apparently an eating vessel.

7) ahtelito - This translates as "plate", a vessel off of or out of which to eat.

8) kanuhihlti - This also means "plate". The difference between this and the previous form is unknown.

9) unuweta - The English translation for this form is "bowl", either a serving or eating vessel. The difference between this and the term used for "dish" above (Form 6) is unknown.

10) uthalcki - This is translated as "kettle", and must refer to a large cooking vessel. The material of construction is unknown, but in the other languages studied here "kettle" usually refers to black cast iron vessels.

11) tsula?ski - The translation for this is "large pot" and apparently refers to a cooking vessel. The difference between this and the previous form is unknown.

12) ṿnthi - The translation for this is "pottery", a general term for native ceramic apparently. The term also means "pipe", probably of the smoking variety. This probably refers to aboriginal times when smoking pipes were frequently made of pottery.

13) ahto?clvkstohti - This is translated as "saucer". There are no native vessel forms of the saucer shape so it is assumed that this is a recent term.

14) kaneso·lvsto?ti - The translation of this long form is "strainer" or "collander", a vessel with multiple holes used to separate mixed liquids and solids. This is also apparently not an aboriginal form.

15) khanẹsa - The translation for this term is simply "box". It probably refers to a wooden container. These may have been present aboriginally.

16) thalụtsa - This, the final Cherokee term recorded here, is translated as "basket", following the pattern of separate terms for these containers in all the other languages.

The Cherokee data are intriguing, but too incomplete at present to allow a meaningful vessel classification to be developed. The distinction between liquid and food containers seems to be present as does the separation of baskets. No certain distinction between ceramic and metal containers was determined but the lack of sufficient data makes this difficult to assess. A recent paper by King (1977) attempts to classify archaeologically recovered Cherokee vessels according to terms supplied him by present day Cherokee potters. He defines ten groups of vessels and discusses various uses for them. While further detailed studies of Cherokee may profit from this work, its use here is limited by the fact that modern Cherokee speakers may have different classification schemes than did pre or early historic Cherokee and that the people at Joe Bell were in all probability not Cherokee anyway.

## Summary

As stated earlier in this chapter, the Choctaw data, because of its most complete nature, were better than all of the others in terms of the ability to reconstruct the classification of containers. It is instructive to see what is not included in that system, or for that matter, in any of the other languages.

None of the container terms made any reference to decoration of those containers. Not a single form with an affix related to painting, incising, stamping, nor any other potential decorative technique. This may be interpreted in a number of different ways. It might mean that the vessels were generally not decorated, a possibility not in accord with archaeological evidence. While plain vessels are common in the southeast, decorated ones are just as common. Designs may have been applied but not discussed per se. An alternate idea may relate to our concept of "decoration" itself and its applicability to many classes of items. In fact, the word for "to decorate" in Choctaw (shema) applies almost exclusively to people and not things. This apparently lack of a concept meaning "decorated" things might explain the lack of "decorative" types of containers in all the languages. Finally, it is possible that none of the word lists is sufficiently long to have recorded examples of decorative terms applied to containers, but this seems unlikely. The implication for all of this for archaeological purposes is that nothing about vessel classification according to our notion of decorative attributes is to be gained from the linguistic data.

Vessel size information was recorded for a few classes of vessels, particularly cooking vessels. These were recorded as simple diminutive and augmentative suffixes usually. There was no reduplication of diminutive or augmentative suffixes to mean "very large" or "very small". Thus all that can be deduced about size classes are three size classes --"small", "normal" (the Unmodified linguistic form), and "large". These three classes were not present for every type of vessel. Most vessel-use classes had only one size (actually no size)--"normal".

A very few instances of shape modifier suffixes were recorded. These include "flat" and "curved" as the most common, but these were all quite rare. Beyond this, shape distinctions are included in the data only to the extent that given vessel use categories had restrictions on shape imposed by the intended use. Plates would not be used for holding water and kettles would not be used for drinking vessels for example. Archaeologically recognized variables of shape such as bottom shape, rim shape, etc., were likewise not directly represented in the linguistic data.

The greatest variation in terminology within a given use class was consistently within the class of vessels used for water containers implying that water was, logically enough, very important. Further, there was a consistent three part classification scheme for water container terms which includes separate terms for containers used to get water from its source, to store water, and with which to drink. It further appears that gourds were commonly used as drinking vessels in aboriginal times, although this has not been verified archaeologically.

Special container use terms for washing were found only in Choctaw, although this does not mean similar terms were not present in the other languages, particularly Muskogee ones. In Choctaw itself an interesting three part division of washing containers was recorded. These included separate terms for containers used to wash: 1) the face; 2) the body; and 3) anything else. Further, all of these terms emphasized the container as a "place" for washing and not a container for wash water.

Most of the terms which refer to non-native containers or containers made of non-native materials (metal, glass, etc.) are descriptive compound forms. Terms which as simple roots with no other meanings than the word intended are assumed to be older words (when it can be assumed that they are not borrowed from another language). For many of the languages the data were so recently recorded that there are as many or more terms which were not aboriginal terms as were. This certainly makes analysis of the classification schemes more difficult.

Terms relating to food usually are classified into cooking vessels and eating vessels. No vessel terms were specific for food preparation as such. Foods were probably "prepared" in the same vessel in which they were cooked--usually boiled. No terms were specific for containers used to gather plants (nuts, berries, etc.).

In all but one of the languages studied only one term was used for "basket". There was no variation for basket terms within languages based upon the uses for these baskets. This is somewhat surprising considering the wide use of baskets in the Southeast in historic times.

There were no size or shape modifying affixes recorded for any of the basket terms.

Finally, the use of terms for storage containers (non-liquid) seems to be minimal. There is some evidence from Choctaw, but not much from any of the other languages. This may imply that storage of items, in containers, even food, was not something common in the Southeast. We know ethnohistorically that food was often stored communally in "corn cribs" or other small buildings.

## CHAPTER 12

### Vessel Analysis - Summary

The previous five chapters have been used to study the classification of ceramic vessels. This was done with an eye ultimately toward discovering how they were classed by the makers of the vessels as well as how they were used. A total of three very different methods were used to classify vessels and each will be summarized here. Because the three methods are so different it is very difficult to ultimately judge which is the best or most correct method. All of the methods can be said to have produced different insights into the classification and thus all are useful.

The first method, outlined in Chapter 8, was a brief analysis of the vessels using a number of intuitively derived shape classes. These are groups which visually appear to be consistent in shape within each class but different across classes. A total of six classes were detected in the vessels from the Joe Bell site. Histograms were created within each class based upon the size of the vessels as measured by each vessel's rim diameter. These were drawn for only four of the six classes, two of them having too few vessels to allow this procedure. While some of the histograms showed three separate size categories within a given class, others showed only one. The total number of shape-size categories was between eight and eleven. Specific uses for these are not posited here, although the similar work of Hally (1980b) can and will be used as a comparative data source in the near future.

The second method used is that of a complex statistical cluster analysis. This was presented in Chapters 9 and 10. While the previous method used "shape" as visually defined and "size" based just upon lip diameter, this method uses data on 38 separate variables recorded on all vessels. These recorded variables can be grouped into three major categories--those of decoration, those of shape or form, and miscellaneous items such as location, number of sherds in fragment, etc. These data were then used to cluster the vessels statistically using both different groupings of variables and different clustering techniques.

The different variable groupings were three in number and included: 1) variables of decoration only, 2) variables of shape or form only, 3) all variables. Of three clustering techniques, Complete Linkage produced perhaps the best groupings of vessels, although Ward's Method was a useful alternative. The cluster analysis did tend to form clusters in the second and third experiments listed above that visually equated with the sorts of groupings formed in the Chapter 8 intuitive analysis discussed above, but no attempt has been made to produce an equation of the different results. This, however, does lend credence to the results of the cluster analysis on other levels. For instance, of the 22 variables which were used for the form/shape experiment, only five were not apparently used to divide the vessels to the ten cluster level. Thus many more vessel variables were apparently significant than would have been revealed by simply intuitively defining shape classes. Of particular surprise were the apparent importance of temper, rim shape, and rim form in the cluster analysis in spite of the low correlation of these variables with other variables as discussed in Chapter 9.

Analysis of the designs on the 50 odd decorated vessels showed that only five out of eleven variables were important for the Complete Linkage analysis to the six cluster level solution. The resulting decoration clusters have not yet been correlated with vessel shapes, whether defined intuitively or through cluster analysis, and this is planned for further research on the data set. The cluster results using all 38 variables also produced groupings but because of the complex nature of the data set were less interpretable than either the form/shape analysis or the decoration analysis. In fact it appears likely that probably too many variables are included here to produce really usable results, a situation that is probably true after a certain point for all multivariate statistical techniques.

The last method of vessel analysis undertaken for this research was that of the linguistic analysis of terms for containers in various Southeastern Indian languages. Data were gathered from eleven separate languages for the project. These are Atakapa, Biloxi, Cherokee, Chickasaw, Choctaw, Mobilian, Muskogee, Ofo, Seminole, Tunica, and Yuchi. Of all the languages Choctaw produced by far the best single set of data for analysis here. A total of almost 100 separate terms or phrases were recorded for Choctaw which made reference to containers of all sorts. These Choctaw linguistic forms were classified into about 20 root forms, all of which were listed and discussed individually in Chapter 11. These 20 root forms, based upon their uses and meanings within Choctaw, may be classed into containers used for five categories. These are containers for: holding water or liquids, holding food (for cooking primarily), for storage (of anything), for washing things in, and for general purpose uses.

A number of points can be made about the Choctaw and other linguistic classification schemes. First, there is no direct reference to shape per se in the container use categories derived. While the connection may have been understood by the makers and users of both the vessels and the terms that go with them this connection can not be derived simply from an analysis of either data set alone. Second, none of the linguistic data makes any reference to decoration on or as a part of any containers. Thus, although many vessels had lines on them this is not reflected in the linguistic formulations. There is some doubt whether our notion of "decoration" was ever applied to the "designs" placed on the vessels. Finally, there is reference in the linguistic data to size variation within given classes of containers. This is denoted generally by either diminutive or augmentative suffixes. Some container terms utilize all three forms, some two ("normal" plus either "big" or "little" but not both), and some only one size form. The absolute size of any container category is not indicated in any case. It may be possible to equate some of the multiple size categories within shape classes as revealed in intuitively designed classifications such as that presented in Chapter 8 with some of the multiple/single size linguistic formulations presented in Chapter 11, but this has not been done yet.

The only possible implication of function (social significance) found in the study is from the brief ethnographic data presented above in Chapter 7. In Penicaut's description of the Pascagoula reference is made to the sharing between families of the food from a common cooking vessel (Swanton 1946:550-1). This sort of interaction and cooperation would foster closer social ties between separate families. The cooking vessel's "function" is to strengthen social bonds between separate families within a small community. This may be analogous to the way large common containers are used for food among the Yanomamo of South America for instance (Chagnon 1977). Certainly there may be other social functions for this food sharing behavior than this one though.

Vessel use studies are becoming more and more common, but I would argue that this can or should be attempted only on large assemblages of vessels from sites covering all parts of an entire society's settlement system. There may be discoverable patterns in a set of ceramic vessels which had no meaning to the makers of that ceramic assemblage. While these patterns might be useful for traditional culture-history analyses, they may tell us nothing of the actual use, meaning, and function of these vessels in the particular society in question. The crux of this is that modern observed differences in form may not equate with actual vessel use in a given society and unquestioningly to assume so may well be an error. It is hoped that studies of the sort attempted here may ultimately lead to a more objective understanding of past ceramic systems in the Southeast.

## CHAPTER 13

## SUBSISTENCE ANALYSIS

The floral and faunal collections from the Joe Bell site were not large. All of these remains were from features on the site, none being preserved in other locations. Preservation varied somewhat from feature to feature, although original use of these features played a part in determining which did and which did not have remains present.

### Faunal Remains

A total of 8677 bones and 5741 shell fragments were recovered and identified from 9Mg28. The total number of remains recovered was slightly higher than this. Reasons for this incompleteness include the following: In 1969, when Features 1 and 2 were excavated, all of the fill was screened through 1/4 mesh screen but not all of this was then processed through window screen with water to recover small bones. Although much of Feature 2 was processed this way, no more than 1/3 of the fill of Feature 1 was window screened. Additionally, the window screened residual for both features was not completely analyzed, although most bones were probably recovered. Thus the total bone count for both of these features is low.

More bone was recovered from Feature 5 than any other feature on the main part of the site (Feature 13, to be discussed shortly, was several hundred yards south of the main site proper). All of the fill was 1/4 inch screened and then window screened with water. Only about 1/2 of the window screened fill was separated and analyzed due to time and money limitations however. This means that the reported bone total of 2005 bones is somewhat less than in the whole feature. The entire fill of Features 12, 18, and 19 were window screened with water, separated, and identified. Feature 15 was window screened with water but only about 1/2 of the residual was separated and identified, again time limits making this total a bit low. Small portions of Features 8, 9 and 10 were water screened and these yielded but small amounts of charcoal and no animal bone.

Certainly for those which were incompletely identified the loss of information was primarily for species with small bones such as fish. Overall, however, sufficient quantities of bones were recovered to allow moderate confidence in the reported figures, if only in relative proportions. In general, animal bone preservation was quite good. This is in sharp contrast with the very poor preservation of the human bones in the three burials on the site. Why this should be true is uncertain but even fish scales and spines were well preserved in the ashy midden soil typical of many features.

Feature 13, while included in the list of features, is off the main portion of the site to the south and dates to the Duvall Phase occupation of Area 1 (see discussion in Chapter 4). Large quantities of animal bones were recovered from this feature. In fact the total of 4786 bones is greater than the total from all the rest of the identified bones from the site. The information on the fauna from Feature 13 are thus treated separately here. Comparisons between these and the data from the major Bell Phase occupation at the site will be made shortly.

A note of explanation is necessary for Tables 10 and 13 to follow. These tables list animal bones identified to at least the taxonomic level of class (e.g. family, genus, or species). Most of the simple interpretations of animal use made in this chapter are based on these charts. This is in contrast to most of the rest of the Wallace Reservoir site reports in which the analyses and interpretations were done to at least the level of family. The categories of "unidentified fish", "unidentified mammal", etc. were not utilized in these later reports as they are used here. The reason for this difference is as follows.

The faunal collection from 9Mg28 was the first of the Wallace Reservoir collections to be analyzed by the faunal laboratory at the University of Georgia. At that time the faunal comparative collection had a limited selection of fresh-water fish. Thus the proportion of the fish bones identified to at least the family level from 9Mg28 were significantly less than for most of the rest of the Wallace Reservoir sites which had the benefit of a larger comparative fish collection. Approximately 7 times as many fish bones were identified to the family level of analysis from 9Ge175, for example, than from 9Mg28 (data from Shapiro, 1981a). Time and money limitations have prevented the reanalysis of the fish bones from 9Mg28.

If data identified only to the family level or better (as opposed to class or better) had been used in the analysis of 9Mg28, fish bones would have been almost completely eliminated. In order to present the data both ways it was decided to present the class data in this chapter

(Tables 10 and 13) and the data to the family level (extracted from Tables 9 and 12) in Appendix K.

For all features animal bone was totaled separately from the mollusc shell data (Tables 9 and 10). This was done because the large number of shell fragments from some features tended to obscure patterns of vertebrate animal use. Very little use was made of the calculation of minimum number of individuals (MNI) except for Feature 5, since the bone sample was too small. For the same reasons no calculations of relative meat yield were made. If the MNI calculations had been done white tailed deer probably would have been shown to have been the most important single meat source for these people.

Feature 1, the probable Busk clean-up feature, had only 162 bones recovered from the fill, all of which were small broken fragments except for one almost complete water turtle carapace. Of the identified bones almost 70% were the remains of mammals. Among the identified species are deer, rabbit, grey squirrel, beaver, and raccoon. Turtle remains accounted for 26% of the total and included soft shelled turtles (Trionyx) in addition to the slider water turtles (Chrysemys). Only six fish bones were recovered which represented 4% of the identified bones. One of these was from a redbreast sunfish (Lepomis auritas). Although water screening was incomplete on this feature, it is apparent that, for a large feature with large quantities of material remains present, this is but a small quantity of faunal remains. Apparently animal bone deposition was secondary in the use formation of the feature and this corresponds to the interpretation of it given earlier.

In contrast to the animal bone, a moderate quantity of mollusc material was present in Feature 1. A total of just under five pounds

Table 9

9Mg28, Bell Phase Features
Animal Bone

| | Feat 1 | Feat 2 | Feat 5 | Feat 12 | Feat 15 | Feat 18 | Feat 19 | Feat 23 | Totals |
|---|---|---|---|---|---|---|---|---|---|
| Unidentified Bone | 15 | 3 | 945 | 264 | 96 | 72 | 66 | | 1461 |
| Unidentified Fish | 5 | 7 | 647 | 2 | 8 | 1 | | | 670 |
| Redbreast Sunfish (*Lepomis auritus*) | 1 | | | | | | | | 1 |
| Suckers (*Catostomidae*) | | | 4 | | | | | | 4 |
| Catfish (*Ictalurus* sp.) | | | 2 | | | | | | 2 |
| Bass (*Micropterus* sp.) | | | 1 | | | | | | 1 |
| Unidentified Mammal | 67 | 15 | 877 | 27 | 48 | 14 | 29 | | 1077 |
| Rabbit (*Sylvilagus floridanus*) | 3 | | 40 | 5 | 3 | | 3 | | 54 |
| Beaver (*Castor canadensis*) | 1 | | 2 | 1 | | | | | 4 |
| Deer (*Odocoileus virginianus*) | 28 | 5 | 142 | 2 | 9 | 1 | 1 | | 188 |
| Opossum (*Didelphis marsupialis*) | | | 2 | | | | | | 2 |
| Field Mouse (*Peromyscus* sp.) | | | 29 | | | | | | 29 |
| Chipmunk (*Tamias striatis*) | | | 1 | | | | | | 1 |
| Grey Squirrel (*Sciurus carolinensis*) | 2 | | 3 | 1 | 3 | | | | 9 |
| Fox Squirrel (*Sciurus niger*) | | | | | 1 | | | | 1 |
| Raccoon (*Procyon lotor*) | 1 | | | | | | | | 1 |
| Mice (?) (*Cricetidae*) | | | 1 | | | | | | 1 |
| Unidentified Turtle | 2 | 11 | 120 | 1 | 55 | 1 | | 11 | 201 |
| Box Turtle (*Terepene carolina*) | | 2 | 30 | | | | | | 32 |
| Slider turtle (*Chrysemys*) | 29 | 2 | | | | | | | 31 |
| Soft-shelled turtle (*Trionyx*) | 8 | | | 1 | | | | | 9 |
| Mud Turtle (*Kinosternidae*) | | | 15 | | | | | | 15 |
| Common Snapper (*Chelydra serpentina*) | | | | 1 | | | | | 1 |
| Blanding turtle (*Emydidae*) | | | 29 | | 4 | | | | 33 |
| Unidentified Bird | | 1 | 41 | 1 | | | | | 43 |
| Turkey (*Meleagris gallopavo*) | | 1 | 2 | | | | | | 3 |
| Quail (*Colinus virginianus*) | | | 1 | | | | | | 1 |
| Woodpecker (*Picidae*) | | | 1 | | | | | | 1 |
| Yellow Shafted Flicker (*Colaptes auratus*) | | | 1 | | | | | | 1 |
| Turkey Vulture (*Cathartes aura*) | | | 1 | | | | | | 1 |

Table 9 (continued)

| | Feat 1 | Feat 2 | Feat 5 | Feat 12 | Feat 15 | Feat 18 | Feat 19 | Feat 23 | Totals |
|---|---|---|---|---|---|---|---|---|---|
| Unidentified Snake | | | 2 | | | | | | 2 |
| Racers (Colubridae) | | | 2 | | | | | | 2 |
| Unidentified Frog | | | 1 | | | | | | 1 |
| Spadefoot Toad (Scaphiapus halbrooki) | | | 4 | | | | | | 4 |
| Frogs (Rana sp.) | | | 2 | | | | | | 2 |
| Salamander/Newt (Caudata) | | | 2 | | | | | | 2 |
| TOTALS | 162 | 47 | 2950 | 306 | 227 | 89 | 99 | 11 | 3891 |

Table 10

9Mg28
Bell Phase
Animal Bone

| | Feat 1 | Feat 2 | Feat 5 | Feat 12 | Feat 15 | Feat 18 | Feat 19 | Feat 23 | Totals | Per Cent |
|---|---|---|---|---|---|---|---|---|---|---|
| Mammal | 102 | 20 | 1097 | 36 | 64 | 15 | 33 | | 1367 | 56.2 |
| Fish | 6 | 7 | 654 | 2 | 8 | 1 | | | 678 | 27.9 |
| Turtle | 39 | 15 | 194 | 3 | 59 | 1 | | 11 | 322 | 13.2 |
| Bird | | 2 | 47 | 1 | | | | | 50 | 2.1 |
| Frog | | | 7 | | | | | | 7 | .3 |
| Snake | | | 4 | | | | | | 4 | .2 |
| Salamander | | | 2 | | | | | | 2 | .1 |
| TOTALS | 147 | 44 | 2005 | 42 | 131 | 17 | 33 | 11 | 2430 | 100.0 |

of bivalve river clam shells (probably Elliptio) and fragments were recovered. Additionally, 1150 small univalve river snails (Goniobasis sp.) were recovered from the fill. Both of these were randomly distributed through the fill of the feature and both were probably used as food sources, the later being boiled in pots to make a broth, the individual meats being too small to extract. A few of the pottery vessels found in Feature 1 (as well as in Feature 5) were coated with a lime buildup on the inside that has the same elemental structure as the shell and undoubtedly is evidence of the shell (with meats) being boiled. Although the bivalves could have been easily opened and the meat removed, the small univalves were boiled as is to make a stock. The presence of the rock snails (Goniobasis sp.), which grow only on the mosses on rocks at shoal areas of rivers implies that the Oconee at this point was relatively rocky and indeed, some rocks are present just below the site today. Silting of the river bed in the last 150 years has probably covered most of the rocks adjacent to the site where these would have been collected however.

Feature 2, a shallow basin, had only 47 bones recovered. Forty five percent of those identified were mammal (deer was the only species recognized), 34% were turtle (box turtle and slider) and 16% were fish (no species noted). Additionally two bird bones, one from a turkey, were identified. Four and a half pounds of mollusc shells were recovered, almost all of which were bivalves. A total of 31 Goniobasis shells were recovered.

Feature 5 had more recovered and identified faunal remains than any feature on the site except Feature 13, the Duvall Phase feature. A total of 2950 bones were recovered, 2005 of which were assigned to class.

Mammals were the most common remains accounting for 55% of the identified bones. These included deer, rabbit, field mouse, grey squirrel, beaver, opossum, and chipmunk. Among the rabbit bones it is remarkable that most of the 40 bones from all levels of Feature 5 were from the feet. Certainly the people would have been eating rabbit, but the feet contain little or no meat and would have probably been discarded, perhaps in the skinning process. The surprising thing is that the other bones which would have been left after the cooked carcass was eaten were not put as trash into this feature where they were deposited is not known.

A total of 654 fish bones were identified from Feature 5 representing 33% of the identified bones. Almost all of these were spines, scales, and vertebrae which could not even be identified to the family level. The few identified fish bones belonged to bass (Micropterus sp.), catfish (Ictalurus sp.), and sucker fish (Catostomus sp.).

Turtles accounted for 194 bones, mostly carapace fragments, in this feature. Of the 74 fragments identifiable to genus most were box turtles (Terrapene carolina) and mud turtles (Kinosternon sp.). Turtle bones accounted for almost 10% of the identified bone in Feature 5.

Bird bones were more common in Feature 5 than all other features - including Feature 13. A total of 47 bones were identified from here, although only six were identified to species. These included turkey, quail, yellow-shafted flicker, turkey vulture, and one of the woodpecker family (Picidae). The turkey vulture or buzzard remains consisted only of a wing bone. Buzzard wings were often used in the Southeast as religious paraphenalia and the wing feathers were believed to be important for cleansing wounds (Swanton 1946:251, 442).

Additional animals included seven frog bones (spadefoot toad and bullfrog family), two bones from a salamander or a newt, and four snake bones (none identified to species). All of these are rare on the site and collectively account for only .7% of the Feature 5 identified bone.

A total of 10.23 pounds of mollusc shells were recovered from Feature 5. Almost all of this weight is from bivalves, predominately Elliptio complenatis, the common freshwater clams native to the region. These are still available locally, often being found in the sandy areas at points or bars along the Oconee. It should be noted that, for the intact bivalve halves, almost twice as many left as right shell halves were preserved in Feature 5. Whether this is merely accidental or related to the manner of opening these shells is unknown. For all other features the ratio of lefts to rights was close to one to one.

Some 657 small univalve rock snails (Goniobasis sp.) were recovered. As with those in Feature 1 described above, these would have been boiled to make a broth. Some land gastropods were also recovered from Feature 5, but whether these were eaten or just crawled into the garbage filled pit is unknown, although the latter is quite possible.

All in all, Feature 5 had a wide range of faunal species present with mammals being the most common while fish and turtle remains representing important secondary species. These remains represent a diversity of animals in terms of habitats exploited. Both land and water oriented creatures were taken as food with neither being significantly more common than the other. The presence of snakes, frogs, and salamanders suggests that almost anything that could be caught was used for food.

Feature 12, a small ash filled pit, contained a total of 306 bones, only 42 of which could be identified to class. Most of the rest of the bones were small crushed fragments. Of these 42 bones, 37 or 86% were of mammal origin. Identified species include deer, rabbit, beaver, and grey squirrel. Of three fragments of turtle shell, soft shelled turtle (Trionyx sp.) and common snapper (Chelydra serpentina) were represented. One unidentified bird bone and two unidentified fish bones were also recovered and only a single Goniobasis shell was found in the fill of Feature 12. The only species found here not found in any other feature was the snapping turtle.

Discussion of Feature 13 will be deferred until the completion of the Bell Phase features. Feature 15, a relatively large trash pit, had only a small amount of faunal remains, particularly compared to Feature 5. A total of only 227 bones were recovered, 131 of which were identified to class. Of these 64 or 49% were from mammals. These included deer, rabbit, grey squirrel, and the only fox squirrel remains from the site. Turtle bones accounted for 45% of the identified bones, but were not identified to species. The remaining few identified remains were unidentified fish bones. This restricted inventory implies that deposition of animal bone was not a prime use for Feature 15. Additionally, very little mollusc material was recovered here. The only remains were a single unidentified gastropod and five bivalve fragments.

Feature 18, a small pit, yielded 89 bones only 17 of which were identified to class. The rest, like Feature 12, were small crushed fragments. Fifteen of the 17 identified bones were from mammals, deer being the only one identified. A single unidentified fish bone and one unidentified turtle shell fragment were the only other bones of note.

Fourteen unidentified gastropods and 46 bivalve mollusc fragments, mostly small, were found in the fill of Feature 18.

Feature 19, a small pit like Feature 18, had 99 bones, 33 of which were identified to class-all of which were from mammals. Deer and rabbit were the only species present. Additionally, 27 mollusc bivalve fragments were found with the bones in this feature.

Only a small center portion of Feature 23 were excavated and eleven bones, all of which were unidentified turtle remains, were recovered. No mollusc shell fragments were found in this feature.

For the Bell Phase part of the site, which formed the major part of interest, a total from all features of 3891 bones were recovered. Of these 2430 or 62.5% were identified to at least the level of class. Mammals formed 56.2% of the identified bones to be the most common by far. Fish were second with 28% of the identified remains followed by turtle with 13%, birds with 2%, and frogs, snakes, and salamanders combined yielding only .5% of total identified bones.

Within the mammals, deer represented 64.8% of those bones identified to species (188 out of 290), more than three times as common as any other mammal bone. Eastern cottontail rabbits were next in abundance, representing 18.6% of the identified mammal bones, while field mouse bones were third most common with 10%. Whether the latter were actually a food source is uncertain however. Grey squirrel represented 3% of the identified mammals while beaver remains accounted for 1.4% of the total. Opossum, chipmunk, raccoon, and fox squirrel were all present in very small numbers but could not be considered important as food sources and were probably taken only occasionally.

Certainly deer and rabbit formed the two major mammals used for food during the Bell Phase.

Fish bones, as the second most common faunal remains of the Bell Phase, were, because of their small size and the similarity of the post cranial elements across many species, were mostly unidentified. The only identified fish were sucker fish, catfish, bass, and redbreast sunfish. Because of the general small size of fish bones, this group is possibly slightly under represented in the archaeological collection, but water screening was adequate to be confident that, in terms of bone counts and in all probability meat yield, fish were not nearly as common in the diet of the people at 9Mg28 during Bell Phase as were the mammals.

Turtles were a strong third in terms of bone counts at this site. Only 37.6% of the turtle bones (121 out of 322) could be identified past the unidentified turtle level. Of these 26.4% were box turtles, 25.6% were of the genus Chrysemys (larger water turtles such as sliders), and 27.3% were identified just to the family Emydidae which includes both of the above. Mud turtles, which are smaller, formed 12.4% of the identified turtle remains while soft shelled turtles (Trionyx sp.) formed 7.4% of the collection. Only one bone from a common snapping turtle was recovered. All in all, turtles apparently were common in the diet and almost any type found was used. The presence of several types (particularly Chrysemys sp.) which are adapted to life in the river, coupled with the quantity of fish remains at the site imply that river life was a moderately important food resource for these people.

Birds were present but not common parts of the faunal assemblage at 9Mg28. They accounted for only 2.1% of the identified bones from the site (50 out of 2430). Of those identified to species turkey, quail, turkey vulture, and yellow shafted flicker are represented. Although it is not surprising to find turkey and even quail in the collection both of these, particularly turkey, seem underrepresented. Only three bones identified as belonging to turkey were found on the entire site in Bell Phase contexts. The rarity of the relatively easily hunted turkey in the diet may imply that they were not common in the area.

Of frogs, snakes, and salamanders, all were present but all were very rare and contributed in no substantial manner to the diet. Of the three, however, frogs were the most common. Frogs could have easily been gathered by children and added to the evening meal.

Molluscs collected from the Oconee River adjacent to the site formed a food resource for the people that, while not of primary importance, was a significant secondary source. Most features had some mollusc remains, although the amount varied a good deal. In terms of meat yield the river bivalve clams, primarily of the genus _Elliptio_, were far and away the most important group. It is difficult to impossible to quantify this material because the remains varied from whole shells to very small pieces. The weight of bivalve fragments from Features 1, 2, and 5, was about 20 pounds. These would have been available in the sand and mud in and along the Oconee River adjacent to the site. A few specimens of the smaller bivalve genus _Lampsilis_ sp. were identified from Feature 1, although the habitat and use for food would have been the same. In North Carolina Strachey reports that Indians "...boil oysters and mussels together, and with the broth they make a good spoonmeat, thickened with the flour of their wheat" (Swanton

1946:370). Coupled with Lawson's remark that oysters, cockles, and mussels "are eaten by the Indians, after five or six hours of boiling to make them tender, and then are good for nothing" (ibid:279), we may conclude that the molluscs found at 9Mg28 were probably cooked in a boiling solution of water and other things. This conclusion is supported by the presence of the large numbers (some 2000 recovered) of small univalve mollusc shells, 93% of which were of the small fresh water rock snail Goniobasis sp. (Table 11).

The large numbers of these present implies an intentional rather than accidental gathering. These snails, generally only 3/8" to 1/2" long, feed on and live in the native mosses which grow on large rocks in the river. Normally they are somewhat randomly distributed over the rocks under water and may be collected individually. At times of low water, especially late summer and fall, these snails, which cannot live out of the water, move down the sides of rocks and, as the water drops lower, form a thick band of the small molluscs just beneath the surface of the water on the rocks. At this time a person can easily collect by hand a considerable number of these small creatures. I have done this at the rocks at Riley Shoals (now under Lake Oconee) in the late summer of 1978 and found the task quite simple.

There is no simple way to extract the meat from these small shells and none of the archaeologically recovered specimens were crushed. It has been suggested that the tips of the shells were broken off and the mollusc sucked from its shell. Certainly the tips were missing from some recovered specimens from 9Mg28, but this is also true of live specimens found in the river. This idea has no basis for further discussion and is dismissed.

Table 11

9Mg28
Mollusc Data

| Features | Feat 1 | Feat 2 | Feat 5 | Feat 12 | Feat 13 | Feat 15 | Feat 18 | Feat 19 | Totals |
|---|---|---|---|---|---|---|---|---|---|
| Goniobasis | 1150 | 31 | 657 | 1 | | | | | 1839 |
| Land Gastropod | | 11 | 15 | | 7 | | | | 33 |
| Unidentified Gastropod | | | 92 | | 5 | 1 | 14 | | 112 |
| Elliptio complenatus | | | 142 | | | | | | 142 |
| Unionidae | 51 | 107 | 1168 | | | | | | 1326 |
| Unidentified Bivalve | 181 | 547 | 1404 | | 79 | 5 | 46 | 27 | 2289 |
| TOTALS | 1382 | 696 | 3478 | 1 | 91 | 6 | 60 | 27 | 5741 |

The only way left to process these creatures into usable food material is to boil them in water to produce a broth much in the manner discussed by Strachey and Lawson above. There appears to be evidence in another form from 9Mg28 to support this conclusion. A few of the pottery vessels reconstructed from Features 1 and 5 had a layer of white crusty material on their insides varying from very thin to as much as 3/16 inch thick. This material, which comes to within an inch or so of the top of these plain, medium sized, excurvate rim, generally utility vessels, has been determined to be primarily calcium carbonate, the prime constituent of mollusc shells.

In order to verify that this material on the inside of the pots was indeed from boiled mollusc shells a series of analytical experiments were undertaken involving trace element analysis of scrapings from the inside of two vessels, archaeologically recovered clam shells, and modern clam shells from the Oconee River. The technique employed was that of an Argon Plasma Emission Spectrophotometer in which the specimens are dissolved and then burned to analyze their spectral and thus elemental constitution. The archaeological and modern samples were compared and it was found that the match was quite close in terms of elements present and their relative proportions. These results confirm that the material inside the pottery vessels did, in all probability, come from the boiling of mollusc shells in them.

It is not completely clear through what mechanisms the mollusc shell substance was dissolved and redeposited on the vessel sides, although calcium carbonate, the primary substance, is very slightly dissolvable in even neutral pH water. If the water were slightly acidic, either natural as collected or through the addition of other substances, the action would be much faster. Certainly this would be aided through long periods of boiling as suggested by Lawson, as well as frequent and repeated use of the same vessel for cooking molluscs.

While it may or may not be reasonable to think that the large bivalve clams would have been cooked in their shells, certainly, as pointed out above, they only way to deal with the small univalve Goniobasis sp. shells was to boil them en masse. The broth or stock thus produced may have been a standard soup or stew starter mixture. Certainly, boiling of food for long periods of time was a standard preparation method for Southesatern Indians in historic times (Hudson 1976:300-309).

Although they were not specifically separated and quantified, at least two other aquatic univalves were recovered in small quantities. These are the Amnicola and Campeloma genera. The former are very small (1/8 inch or less) while the latter are larger than the genus Goniobasis --1/2 inch to 3/4 inch long and fatter. Both occur with the Goniobasis in the mosses or rocks in the river but occur in much smaller numbers. It is probable that they were gathered unintentionally with the Goniobasis shells at the same time the latter were gathered from the rocks.

Three genera of land snails were also noted in very small quantities in Feature 1 as well as Feature 2 and 5. These include Zonitoides --a small 1/8 inch shell, Helicodiscus--a 1/8 inch flat spiral shell, and Tridopsis--a large one inch diameter snail. While it is possible that the latter of these may have been gathered, most of the land snails probably just crawled into the garbage piles and lived and died there.

Discussion of Feature 13 has been postponed until this point because, as pointed out earlier, it is from an earlier period of occupation, the Duvall Phase of the Lamar Period, and is not on the main part of the site. This oval shaped apparent trash pit, most of which was water screened, had a total of 4786 bones recovered from its fill (Tables 12 and 13). Of these bones, 2762, or 57.7% were identified to the proper class. A quick inspection of the resulting figures immediately shows a striking difference in the proportions of these classes between them and these already discussed for the Bell Phase component of the site discussed above. While mammals were the most important class in the Bell Phase component accounting for 56.2% of the total identified bone count, these made up only 5.8% of the identified mammal bone in the single Duvall Phase feature. Rabbit, which was second in the Bell Phase with 18.6% was first among the Duvall Phase mammal bones with 57.1%. Chipmunk, which was less than 1% in the Bell Phase was 31.7% of the identified mammal bone in the Feature 13. Grey squirrel was 3.1% in Bell Phase and 11.5% in Duvall Phase. No mouse bones were found in Feature 13, but represented 10% of the mammal bones in the Bell Phase.

The biggest difference in the faunal assemblages of Feature 13 and the rest of the site was in the proportion of fish bones. Whereas in the Bell Phase, fish remains had accounted for 27.9% of the remains identified to class level, they represented 87.4% of the bones identified to class from Feature 13. Suckers and catfish as well as sunfish were present in Feature 13 as well as in the Bell Phase component. One spotted sucker fish bone was found in Feature 13. Many of

Table 12

9Mg28 Feature 13
Animal Bone

| | Level 3 | Level 4 | Level 4A | Level 6 | Level 7 | Misc. | Totals |
|---|---|---|---|---|---|---|---|
| Unidentified Bone | 134 | 450 | 182 | 487 | 272 | 499 | 2024 |
| Unidentified Fish | 4 | 133 | 24 | 115 | 94 | 139 | 509 |
| Fish Spines and Fragments | 16 | 258 | 120 | 457 | 301 | 173 | 1325 |
| Fish Scales and Fragments | 8 | 47 | 44 | 61 | 128 | 201 | 489 |
| Fish Vertebrae | | 24 | 7 | 17 | 2 | 25 | 75 |
| (Minytrema melanops) | 1 | | | | | | 1 |
| Redbreast Sunfish (Lepomis auritus) | 1 | | 1 | | | 1 | 3 |
| Bluegill (Lepomis macrochirus) | | 1 | | | | 1 | 2 |
| Suckers (Catostomidae) | 2 | | | 3 | | 1 | 6 |
| Catfish (Ictalurus sp.) | | 3 | | | | 2 | 5 |
| Unidentified Mammal | 1 | 17 | | 9 | 8 | 21 | 56 |
| Beaver (Castor canadensis) | | | | | 1 | | 1 |
| Rabbit (Sylvalagus floridanus) | 1 | 21 | 2 | 7 | 6 | 12 | 49 |
| Deer (Odocoileus virginianus) | 1 | | | 4 | 1 | | 6 |
| Opossum (Didelphis marsupialis) | | | | | 1 | | 1 |
| Chipmunk (Tamias striatus) | | 17 | 5 | 5 | | 6 | 33 |
| Grey Squirrel (Sciurus carolinensis) | | 3 | 3 | 4 | 1 | 1 | 12 |
| Rodent Teeth | | | | 1 | 1 | | 2 |
| Human Tooth | | | | | | 1 | 1 |
| Unidentified Turtle | 8 | 25 | 4 | 30 | 2 | 37 | 106 |
| Mud Turtle (Kinosternidae) | | 1 | 3 | 5 | 1 | 2 | 12 |
| Soft-shelled Turtle (Trionyx sp.) | | 5 | | 13 | 2 | 8 | 28 |
| Musk Turtle (Sternotherus sp.) | | 4 | | | | | 4 |

Table 12 (continued)

| | Level 3 | Level 4 | Level 4A | Level 6 | Level 7 | Misc. | Totals |
|---|---|---|---|---|---|---|---|
| Unidentified Snake | | | 1 | | 1 | 1 | 3 |
| (_Serpentes_) | | 2 | | | | | 2 |
| Racers (_Colubridae_) | 1 | 8 | 2 | 1 | | 2 | 14 |
| Rat/Corn Snakes (_Elaphe_) | | 1 | 2 | | | | 3 |
| Water Snake (_Natrix_) | | | | | | 1 | 1 |
| Copperhead/Cottonmouth (_Agkistrodon_) | | | | | | 2 | 2 |
| Mud Snake (_Farancia_) | | | | | | 1 | 1 |
| Unidentified Bird | | | | 1 | | 1 | 2 |
| Turkey (_Meleagris gallopavo_) | | | | 2 | | 3 | 5 |
| Crow (_Corvus brachyrhynchos_) | 1 | | | | | | 1 |
| Blue Jay (_Cyanocitta cristata_) | 1 | | | | | | 1 |
| Herons (_Ciconiiformes_) | 1 | | | | | | 1 |
| TOTALS | 181 | 1020 | 400 | 1222 | 822 | 1141 | 4786 |

Table 13

9Mg28 Feature 13
Animal Bone

| | Level 3 | Level 4 | Level 4A | Level 6 | Level 7 | Misc. | Totals | Per Cent |
|---|---|---|---|---|---|---|---|---|
| Fish | 32 | 466 | 196 | 653 | 525 | 543 | 2415 | 87.4 |
| Mammal | 3 | 58 | 10 | 30 | 19 | 41 | 161 | 5.8 |
| Turtle | 8 | 35 | 7 | 48 | 5 | 47 | 150 | 5.4 |
| Snake | 1 | 11 | 5 | 1 | 1 | 7 | 26 | 1.0 |
| Bird | 3 | 0 | 0 | 3 | 0 | 4 | 10 | .4 |
| TOTALS | 47 | 570 | 218 | 735 | 550 | 642 | 2762 | 100.0 |

the fish bones from Feature 13 were not identified to species, but consisted of post cranial elements such as scales, vertebrae, and spines.

Turtles were less important in the Duvall Phase Feature 13, accounting for only 5.4% of the identified bone as opposed to 13.2% of the identified Bell Phase bones. The turtles present in Feature 13 were soft shelled and mud or musk turtles. One of the larger river sliders (Chrysemys sp.) were identified from Feature 13.

Snake bones were more common in this Feature - 26 as opposed to only four from all of the Bell Phase features. A wide variety was present in Feature 13, including rat or corn snakes, mud snakes, copperhead or cottonmouth snakes, and water snakes. It seems probable that these were used as a minor food source.

Bird bones were much rarer in the Duvall Phase component, only ten bones accounting for .4% of the identified bone as opposed to 50 in the Bell Phase features which formed 2.1% of that assemblage. The most common bird bones in Feature 13 were turkey (five bones). One bone each was found belonging to a common crow, a blue jay, and a heron or egret. No frog or salamander bones were found in Feature 13.

It is paradoxical that despite the emphasis on river species present for most of Feature 13, molluscs played only a small part in this Duvall Phase assemblage. Only 91 fragments were recorded from the feature, most of which were small fragments of bivalve clams. While these animals were being used, certainly they were not as important in the single Duvall Phase feature as they were later in the Bell Phase.

All in all, however, it is hard to ignore the fact that the Duvall Phase inhabitants who produced the assemblage from Feature 13 was far more dependent on the products of the Oconee River than those of the

Bell Phase just upstream in the main part of the site. The large quantity of fish bones may imply either poisoning or the construction and use of a fish weir to facilitate captures in quantity. No visible remains of a V-shaped weir are present in the river at present, however. If we assume that Feature 13 is representative of Duvall Phase animal subsistence (and Feature 13 probably represents the best preserved in context assemblage of faunal remains from the Lake Oconee project) then a dramatic shift took place between Duvall and Bell Phase. It should be pointed out that there is very little evidence of the intervening Dyar Phase in the vicinity of 9Mg28. This shift involved a decreased emphasis on the products of the river (with the exception of molluscs) and an increased use of land mammals. Sites such as 9Ge175 (Shapiro 1978, 1979, 1981a, 1981b) were primarily occupied during the Duvall and early Dyar Phases and were primarily dependent of river species. It must be acknowledged that 9Ge175 was an extractive site keyed to the river products at Riley Shoals downstream from 9Mg28 some miles, but the emphasis on the river as opposed to the land is still apparent overall (ibid). Whether this apparent change in animal subsistence patterning is more apparent than real awaits future excavations.

Although not mentioned earlier, a fairly large quantity of what appears to be the hardened and crushed remains of mud-dauber nests occur in several of the Bell Phase features, particularly Feature 5. This material has not been quantified (weight would be the only reasonable measure) at present. While most of the fragments are fairly finely crushed, some retain identifiable evidence of their former origin. Wasp larvae were occasionally used for food in times of scarcity in the southeast in the historic period (Swanton 1946:252).

That the larvae of mud-daubers would have been used also seems quite likely. It is also noteworthy that most of the small fragments recovered have a thin but firmly adhering coating of a white substance which is probably calcium carbonate (it reacts vigorously with hydrochloric acid). This coating may have been deposited by ground water percolating through the same features in which discarded clams were present, but this is not too likely since not everything else in the same features had a similar coating. Of greater likelihood is that the mud dauber nests with the larvae intact, were boiled in containers which either had molluscs boiling at the same time or at least in vessels which had the molluscs boiled in them previously and retained some calcium buildup. Material of this sort has now been recognized from a few other sites in the Lake Oconee area as well as recently in the excavations at 9Eb85, the Beaverdam Creek Mound, a Savannah II period site on the Savannah river near Elberton some 50 miles to the northeast (Rudolph: Personal Communication). These remains may in fact be more common than suspected and have been systematically ignored as small "daub" fragments ostensibly from human construction activities. In any event, their total contribution to the diet must have been minor, perhaps serving as a flavoring or as a spice. It should also not be left unmentioned that the acid nature of wasp venom may have been sufficient in a boiled solution to help dissolve the mollusc shells discussed earlier.

Floral Remains

As expected there was a smaller quantity of floral remains preserved from 9Mg28 than faunal remains. Methods of screening and separation were discussed for the faunal remains previously and will not be repeated here except as necessary. Virtually all the floral material was preserved through the action of charring, either intentional or accidental. Certainly, many of the plants that were used, whether for food or other uses, would not have routinely involved the charring of these plants and thus it is very difficult, particularly with the small sample sizes recovered, to say much about relative importance of different plants to these people.

Analysis of the preserved floral remains form 9Mg28 was divided into two categories--first, charred woods and resins that were quantified by weight in grams and, second, seeds, nuts, and other food related remains that were quantified by fragment counts. There is almost no data available from Features 1 and 2 which were excavated in 1969. No wood charcoal or seeds were recovered for Feature 2 for analysis, although small quantities must have been present. For Feature 1 a single peach pit was recovered, but not much else in the way of seeds. There was, however, a considerable amount of charred wood, possibly pine, in the form of three of four burned logs. Feature 1, as discussed earlier, was probably a large bonfire used to destroy the accumulated pots and other items at the Busk ceremony. Unfortunately, a large portion of this charred wood was sacrificed to the radiocarbon laboratory before being adequately examined or weighed. Probably as much wood charcoal was recovered from Feature 1 as from all the rest of the site, perhaps more. As the nature of Feature 1 is relatively well understood, however this is taken as no loss to the present analysis.

Analysis of the wood charcoal was performed, as was the seed identification, by Elizabeth Sheldon. In her analysis of the wood charcoal identification can be divided into 4 general groups. These include: 1) softwood remains, 2) hardwood remains, 3) mixed softwood and hardwood, and 4) miscellaneous remains.

The softwood remains include charred pine, charred pine with quantities of resin, and charred pine and bark (Table 14) (See Appendix A for Provenience locations). For the site as a whole (excluding Feature 1) this category was the most common, representing 50.1% by weight of all the charred wood recovered for all features. The proportion varied widely by feature, however, ranging from 0% in Feature 23 to 100% in Features 10, 12, 16, and 19. Within the softwood category itself, simple charred pine (without resin or bark) accounted for 78% of the total. Pine with resin accounted for 21.6% of the total. The small remainder (.4%) was made up of pine and bark. Feature 5 had the largest quantified total of softwood charcoal, but it also had the largest total amount of charcoal. As mentioned above Features 10, 12, 16, and 19 had nothing but softwood pine remains. Features 8 and 9 were both almost exclusively softpine, the former had 94.1% and the latter had 86.6% pine. The latter two features, in addition to Feature 8 are discussed as structures. Impressions in the daub recovered from these structures appear to be something other than pine however. The impressions appear more similar to cherry or perhaps beech, but this is uncertain.

Hardwoods, as identified, formed only 8.0% of the total wood charcoal weight. Those were identified within the groups as follows: oak-11.8% (found only in Feature 5), elm-15.3% (found only in Feature 18),

Table 14

9Mg28
Wood Charcoal
in grams

| | Prov 1 | Prov 6 | Prov 8 | Prov 9 | Prov 10 | Prov 12 | Prov 15 | Prov 17 | Prov 19 | Prov 23 | Prov 24 | Prov 25 | Totals | Prov 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wood | 18.6 | | | | | | | | | .5 | | | 19.1 | |
| Resin | .7 | | .3 | | | | | | | | | | 1.0 | 4.25 |
| Wood and Resin | .3 | | | | | | | | | | | | .3 | |
| Bark and Miscellaneous | | | | 39.3 | | | | | | | | | 39.3 | |
| Hardwood | 27.25 | | | | | | | | | | | | 27.25 | |
| Hardwood and Resin | .05 | | | | | | | | | | | | .05 | |
| Ring Porous Hardwood | 19.5 | | | | | | | 1.2 | | 6.75 | 2.65 | | 30.1 | |
| Ring Porous Hardwood and Resin | .85 | | | | | | | | | | | | .85 | |
| Diffuse Porous Hardwood | 2.0 | .1 | | | | | | 17.1 | | | | | 19.2 | |
| Oak | 13.25 | | | | | | | | | | | | 13.2 | |
| Elm | | | | | | | | | | 17.15 | | | 17.15 | |
| Oak or Chestnut | 3.8 | | | | | | | | | | | | 3.8 | |
| Probably Chestnut | .7 | | | | | | | | | | | | .7 | |
| Pine | 192.38 | .5 | 7.2 | 211.95 | 98.0 | 7.45 | 2.5 | 21.8 | 1.65 | .1 | | 3.6 | 547.13 | 9.4 |
| Pine and Resin | 94.75 | | | 55.25 | | .3 | | | | .9 | | | 151.2 | 7.2 |
| Pine and Bark | 2.75 | | | | | | | | | | | | 2.75 | |
| Pine and Hardwood | 29.45 | | .1 | 1.2 | | | | 4.95 | | | | | 35.7 | |
| Pine and Oak | 27.2 | | | | | | | | | 7.15 | | | 34.35 | |
| Pine and Oak or Chestnut | 73.5 | | | | | | | 2.9 | | | | | 76.4 | |
| Pine and Ring Porous Hardwood | 287.55 | | .05 | | | | | 12.8 | | 5.2 | | | 305.6 | |
| Pine, Ring Porous Hardwood, and Resin | 18.1 | | | | | | | | | | | | 18.1 | |
| Pine, Ring and Diffuse Porous Hardwood | 10.75 | | | | | | | | | | | | 10.75 | |
| Pine, Probable Oak, and Resin | 31.05 | | | | | | | | | | | | 31.05 | |
| Pine, Probable Oak, and Ring Porous Hardwood | 6.4 | | | | | | | | | | | | 6.4 | |
| Pine, Possible Tulip Poplar, and Ring Porous Hardwood | 8.95 | | | | | | | | | | | | 8.95 | |
| TOTALS | 869.83 | .6 | 7.65 | 307.7 | 98.0 | 7.75 | 2.5 | 60.75 | 1.65 | 37.75 | 2.65 | 3.6 | 1400.3 | 20.85 |

oak or chestnut-3.4% (Feature 5), and probably chestnut-.6% (Feature 5). Less specific identifications included the following: diffuse-porous hardwood-17.1%, ring porous hardwood 27.7%, ring porous hardwood and resin-.8%, general hardwood-24.2%, and general hardwood and resin-.1%. The only real pattern of note here is the observation that oak and elm represent the most common identified hardwoods in the collection and both would have been available locally, although, as a group, the former would probably have been more common. Feature 23 had only hardwood associated with the excavated portion, while Feature 18 had mostly hardwoods present.

A large portion of the charred wood samples were apparently mixed hard and softwood lots. This accounted for 37.6% of the total sample weight. Given the predominance of softwoods over hardwoods discussed above (50.1% versus 8.0%) it seems probable that, within the mixed samples, most of the samples are predominantly softwood (pine) with smaller amounts of hardwoods. This mixed category is divided as follows: pine and oak-6.5%; pine, probable oak, and resin-5.9%; pine, probable oak, and ring porous hardwood-1.2%; pine and ring porous hardwood-5.8%; pine, ring porous hardwood, and resin 3.4%; pine, ring, and diffuse porous hardwood-2.0%; and pine, possible tulip poplar, and ring porous hardwood-1.7%. The only noteworthy point about this data is the possible presence of tulip poplar wood, even if in very small quantity. Feature 15 contained a mixture of about equal parts softwood, hardwoods, and mixed soft and hardwoods. This was, therefore, one of the only features which had both in about equal proportions.

The last 4.3% of the charred material from 9Mg28, grouped under the heading of miscellaneous, included: bark-68.5%, unidentified wood-32.0%, resin-1.7%, and wood and resin-.5%. Most of the bark and resin are likely pine, although this can not be certain.

If, as is possible, wood from trees formed the fuel for all fires in the village, it is not surprising that pine forms the most important element in the charred wood recovered from the village. Pine, particularly the heart pine with its high resin content, burns easily and lights readily. Hardwoods start more slowly but generally burn longer. For construction purposes hardwood would have been stronger than softwoods, but heart pine will preserve for long periods of time and would have been relatively available. Probably both hardwood, particularly oaks, and some pine would have been used in construction. Pine bark, found in very small quantities, was used historically as a roofing material (Swanton 1946:245).

A very small amount of charred wood was recovered from Feature 13, the Duvall Phase feature. All of this was of either pine or resin (probably also pine). No hardwood material was identified at all.

It should be noted in retrospect that, except for the charred wood in Feature 1 discussed at the beginning of this section, charred wood was not particularly common in the features at 9Mg28, occurring always as small fragments which were probably the remnants of small fires. Fair quantities of ash were recovered from several features, particularly Feature 12. This ash has not been quantified nor has any of it been analyzed.

Seeds, nuts, and other plant food remains were not common at 9Mg28. A total of 111 fragments were recovered from the main Bell Phase part of the site and an additional 88 were found with the Duvall

Phase Feature 13 (Table 15). All of these fragments were preserved through charring as might be expected.

Numerically the most common remains were of corn. Fragments were found in Features 5, 15, and a post hold adjacent to Feature 10. Most of the material (as is true of all of the Bell Phase floral remains) were from Feature 5. Cupules and cob fragments were found only in this feature while kernels were found in all three localities. Two of the cob fragments (no whole cobs were located on the site) were of the eight row type. It is noteworthy at this point that no corn cob filled "smudge" pits, common in other areas, are present at 9Mg28 and are not known for any excavated Bell Phase sites.

While it is no surprise at all that corn was used by these people it is somewhat strange that there were virtually no remains of beans or squash at this site. Two possible seeds of the family Fabacea were recovered however. This includes many leguminous genera, only one of which are beans. Many wild plants are also included, however, and it is best at present to assume that this is not evidence of beans. Certainly corn, beans, and squash together formed an important triumvirate of domesticated plant food resources for most of the ethnographically described Southeastern Indian groups. Admittedly, however, the preserved sample of plant remains from the Joe Bell site is small and the people who once lived here may have still used these. Further, beans are often more rare on archaeological sites than are the remains of corn.

If the lack of beans and squash was a surprise, the presence of peach pits as the second most common plant food remain was startling. A total of 29 pits were found from a total of five different Bell

Table 15

9Mg28

Floral Data

| | Feat 1 | Feat 5 | Feat 9 | Feat 10 | Feat 12 | Feat 15 | Feat 18 | Feat 19 | Sub Totals | Feat 13 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Corn Kernals (Zea) | | 4 | | 1* | | 3 | | | 8 | | 8 |
| Corn Cupules (Zea) | | 34 | | | | | | | 34 | | 34 |
| Corn Cob Fragments (Zea) | | 8 | | | | | | | 8 | | 8 |
| Peach (Prunus persica) | 1 | 12 | | | | 6 | 8 | 2 | 29 | | 29 |
| Hickory Shell (Carya) | | | 3 | | 2 | 1 | | | 6 | 14 | 20 |
| Black Walnut Shell (Juglans nigra) | | 1 | | | | | | | 1 | | 1 |
| Acorn (Quercus) | | 2 | | | | | | | 2 | 2 | 4 |
| Elm (Ulmus) | | 1 | | | | | | | 1 | | 1 |
| Dogwood (Cornus) | | 4 | | | | | | | 4 | | 4 |
| Sugarberry (Celtis) | | 4 | | | | | | | 4 | 47 | 51 |
| Hornbean (Carpinus) | | | | | | | | | | 3 | 3 |
| Spurge/Croton (Euphorbiacae) | | | | | 1 | 1 | | 1 | 3 | | 3 |
| Knotweed/Smartweed (Polygonum) | | | | | 6 | | | | 6 | | 6 |
| Maypop (Passiflora) | | 2 | | | | | | 1 | 3 | 22 | 25 |
| Legume (Fabacea) | | 1 | 1 | | | | | | 2 | | 2 |
| Totals | 1 | 73 | 4 | 1 | 9 | 11 | 8 | 4 | 111 | 88 | 199 |

* From post hole beside Feature 10

Phase features (Features 1, 5, 15, 18, 19). All of these pits were charred--many were but broken fragments although a number were intact specimens. The density of these tough seeds aided their preservation in some numbers thus it is difficult to judge their distribution and, in fact, appeared in more features than any other single plant food remains.

Peaches (Prunus persica) are not native North American plants, originally being domesticated in Northern China by 3000 B.C. (Sheldon 1976:2). Eventually, as east-west trade began, they reached Western Europe (probably by way of the Middle East--peach or pêche in French from "Persia") just as European explorers were beginning to discover the New World. The early 16th century Spanish explorers of Florida may have brought dried peaches with them but this is uncertain. With the settling of St. Augustine in 1565 and the establishment of the Mission chain on the Georgia Coast and across panhandle Florida shortly afterward, peaches soon gained popularity with the native Americans in the region. Peaches quickly were spread through virtually all of the Southeast, probably through existing trade networks and were apparently readily accepted. Sheldon speculates that the size and sweetness of this fruit, which was different from anything growing wild in the Southeast, aided this rapid acceptance (ibid:3). Hawkins tells us that by the late 18th century almost every Indian village visited by him had peach trees growing in them (Hawkins 1916:63).

The presence of reasonable numbers of pits at the Joe Bell site implies that peach trees were being grown at or near the site. Pollen studies, which could help answer this question, are incomplete. It also tells us immediately that the occupation at 9Mg28 must have been some time after the 1560's. The corrected radiocarbon dates in the 1630's are most reasonable in this regard. Several of the pits were examined by members of the Institute of Natural Resources at the University of Georgia. All members agreed that the pits were of a very small thus old variety of peaches. Modern forms have been selectively increased in size. Also the fact that the seeds were symmetrical, as opposed to modern asymmetrical forms, was an indication of age. One person suggested that the small form might be an unthinned tree or from a very young one.

Nut fragments were present but not common in the floral material from 9Mg28. Of these hickory was the most common, being found in Features 5, 12, and 15. Very small quantities of black walnut shell and acorns were also found in Feature 5. These nuts are available in fall to early winter. Seeds from elm (Ulmus), dogwood (Cornus), and hackbery or sugarbery (Celtis) were also recovered from this same feature, again in small quantities.

Seeds from annual and perennial grasses, vines, and bushes were also present in small quantities. These plants, usually called "weeds" in our culture, may well have been food sources for these people. Included in this category are spurge or croton (Euphorbiacae) found in Features 12, 15, and 19; smartweed or knotweed (Polygonum) found in Feature 12; and maypop or passionflower (Passiflora) found in Features 5 and 19. Maypop is mentioned frequently in ethnographic accounts of the Southeast as a common food item (Swanton 1946). All of these are available in the spring and summer, coupled with the nut remains evidence is present for occupation throughout the growing season and probably year round.

The seed remains of Feature 13 are separated from those of the Bell Phase features in the same way the faunal material was. There are distinct differences in the two assemblages. First, as the Duvall Phase is wholly of the prehistoric period, there were no peach remains in Feature 13. Additionally no corn, beans, or squash were present. What was present among the 88 identified seeds were 47 hackberry or sugarberry (Celtis) seeds, 22 maypop (Passiflora) seeds, 14 hickory nut fragments, two acorn fragments, and three seeds from a hornbean tree (Corpinus). All of these are gathered plants, all but the maypops being from hardwood trees which would have been in the area. This assemblage is quite distinct and restricted in comparison with the more generalized collection from the major Bell Phase component at 9Mg28.

By way of summary, the form, use, meaning, and function of the subsistence patterns based on the above data will be discussed, first for the Bell Phase, then for the Duvall Phase, and finally the two in comparison.

For the Bell Phase the economy as seen at 9Mg28 is a very generalized one. That is, a wide variety of plants and animals formed the basis of this diverse economy. Animals include land mammals of many types, deer the most common, fish, turtles, molluscs, and birds, as well as some frogs and snakes. Plants include both wild and domesticated ones. Corn was certainly grown and used, but a variety of wild plants were also utilized in season. These included nuts of several types and seed bearing plants such as spurge, knotweed, and maypops. Peaches were probably grown locally on trees planted near the village. Insects in the form of mud-dauber or wasp larvae were also gathered. The form of the Bell Phase subsistence adaptation, then, emphasized utilization of virtually all food sources available. The use of this collected (hunted, gathered, fished) material was, obviously, for human consumption (although some of it may have been given to dogs--there, by the way, is no evidence of dogs from 9Mg28, but they probably were there).

The meaning of this subsistence pattern is undoubtedly no single thing but would include, among others, the idea that many parts of their local environment were exploited for food. Additionally it means that no one food source was preeminent in their diet. This implies that these people probably had diverse tastes in food and probably had a diversity of recipes. Further, they probably were open to new foods and tastes. The ready adoption of peaches to their diet is seen as evidence in support of this statement.

It is with some trepidation that I discuss the subsistence remains from Feature 13--the largest Duvall Phase trash pit--as actually representative of Duvall Phase subsistence in the Oconee Valley. In fact, I make no such claim at this time, discussing the results merely as representative of Duvall Phase occupation at 9Mg28.

The form of the Duvall Phase subsistence base is far more specialized than that of the Bell Phase and emphasizes product of the Oconee River almost to the exclusion of many other food sources. Fish form the major part of the diet with river turtles being commonly used. Land mammals are used in small quantities and birds are almost absent. Snakes are used in small quantities. Surprisingly, molluscs from the river are not as heavily used as in the Bell Phase. No domesticated plants were recovered, although corn must have been known to these people. Some nuts, berries, and seeds were gathered for food, especially maypop, hackberry, and hickory. All this material was used for food by these people. The meaning of a specialized economy involves a human selection to emphasize food from one part of the environment as opposed to all that is available. This adaption is fine as long as the environment (the river in this case) can continuously renew itself at a level equivalent to or greater than that taken from it by humans, as well as all other predators. Certainly, this is a function of the size of the predatory group, humans in this case. Although there is no other direct evidence at hand, the implication of this type of adaptation by these Duvall Phase inhabitants at 9Mg28 is that it was of a smaller human population level than the Bell Phase occupation. The latter may have been in the range of 50 to perhaps 100 people, probably no more, if that many. Consequently the Duvall Phase occupation may well have been less than 50 people, perhaps less than 25 at any one time.

Fewer people would be required to obtain large quantities of food from the river, particularly if a weir had been constructed beforehand. Males and females may well have worked together to obtain river products although some males still did the hunting and females and children gathered wild plants. Very small children would have been of no help in the obtaining of fish.

Certainly a dramatic difference exists between the subsistence adaptation of the Duvall and Bell Phases components at 9Mg28. Whether this change is due to sampling error (possible for Duvall), change in climate (not too likely), changes in diet preferences (possible), or a combination of these and any other causes is presently unknown and awaits future archaeological excavation and analysis.

## CHAPTER 14

## SUMMARY AND CONCLUSIONS

The Joe Bell site was located in a rich environment with a diverse variety of food sources. It was occupied by Native Americans on at least three occasions in the prehistoric past. The first of these was in the Early Archaic period at perhaps 8000 B.C. The only positively identifiable Early Archaic stone tools were found in a relatively restricted part of the site. This may imply that the site was little used at the time, but this is uncertain. There is no solid evidence that the remains represent more than a small camp site for a few people. However, given the prime location at the junction of two rivers, it may have been a base camp for an entire band for a short period. Certainly most of the artifacts left by these people must have been lost with the removal of the plow zone from the site. As pointed out in the lithics section, it is difficult to know whether the chipping debitage found on the main part of the site belongs to this early component or to the later Bell Phase. In any event, no features from the Early Archaic component was found, and but little is added to our knowledge of that period by these data.

The second occupation at the Joe Bell site was during the Duvall Phase of the Lamar period. This early Lamar phase lasted from sometime in the 14th century A.D. until almost A.D. 1500. Its occupation at this site almost exclusively was restricted to the southern portion (Area 1).

The quantity of ceramics recovered implies a fairly dense occupation and perhaps a very small village was present. The only feature assigned to this occupation was Feature 13, an apparent trash pit found incidental to earth moving operations in Area 1. This feature reveals a strong reliance upon the products of the Oconee River during this time. As discussed in the subsistence portion of this report, this feature contained mostly fish and turtle remains, with but small quantities of land animal remains. No other features or houses were found with this component. Emphasis was placed on what was considered to be the largest component at the site, namely the Bell Phase component. About the only information of use in understanding the lifeways of the people of the Duvall phase found at the Joe Bell site is the above mentioned subsistence data, and this one feature, albeit a large one, may not be similar to Duvall Phase subsistence elsewhere.

The final, and most important occupation of the Joe Bell site was during the Bell Phase, a phase of the Lamar period which lasted from about A.D. 1600 until not much later than A.D. 1675 in the Oconee area. By this time all of the native peoples probably removed themselves further to the west toward the Chattahoochee River. It seems reasonable to believe that the Bell Phase populations evolved in place out of the previous Dyar Phase populations, although major changes certainly took place in the transition. Mounds, which were common during the Dyar Phase in the area, ceased to be made. Bell Phase society apparently became more egalitarian and less complex. The beginning of the acquisition of items of European origin occurs in the Bell Phase, especially glass beads and peaches. In short, the Bell Phase changes reflect nearly identical changes that were taking place over almost all of the

Southeast U.S. at about the same time. These people were adapting to the incursion of Europeans with their diseases, weapons, trade goods, and expansionist mentalities. The Indian cultures were attempting to adapt to an entirely new situation but, as we all know, they eventually lost out to the newcomers.

The Joe Bell site is probably not unique in the Central Oconee River valley. There must have been many other sites of comparable size but so far none have been excavated. The excavated portion of the Bell Phase component at this site was just over one acre. This represents the main portion of the actual occupied area, although it continued somewhat further to the south than was excavated. The total original site size was probably no greater than 1.5 acres. The population size is very difficult to estimate with much accuracy, but the present guess is perhaps 50 to 100 people. Based on the number of structures and the size of the rotunda this range of population seems reasonable. The length of time for the occupation at the site is likewise difficult to estimate. The lack of thick midden deposits, except in features and the redeposited sands of Area 2, may imply a relatively short occupation, as does the fact that there were only three human burials made at the site, although none of this is conclusive. Erosion certainly has removed much of the midden on the site. On the other hand, there are several instances of features intruding into earlier ones. In particular, structural Feature 8 intrudes structural Feature 43. This implies a somewhat longer occupation. I doubt seriously if the site was occupied for more than one generation. Based upon the European bead type, the presence of peach pits, and the corrected radiocarbon dates (Appendix B) the center date for the occupation must have been close to A.D. 1630.

The Bell Phase inhabitants at 9Mg28 had a diverse diet, including hunted and gathered foods from all parts of their local environments, as well as from at least small quantities of domesticated plants, particularly corn. Based upon the recovered subsistence materials, the dependence on agricultural products was not great, however. Many wild plants were also used for food. The use of peaches was common and probably indicates the intentional growing of trees near the site. Products of the river were used as well as those of the land. Year round occupation seems probable.

There are at least two, possibly three structure types represented by the remains at the Joe Bell site. The largest of these is the rotunda, the circular civic structure in the center of the site. This community center was probably the hub of daily activity at the site and the locus of all community-wide decision making. For anyone approaching the village, this would immediately have been seen to have been the largest thing. While the Joe Bell site was probably not unique in the area in possessing such a structure at this time, it is possible that, upon occasion, people living near this village, but not in it, may have been visitors to the rotunda, particularly to exchange news and conversation.

The second structure type at the Joe Bell site was the small, generally circular, earth-covered, semi-subterranean structures of which over 30 examples are present, one group forming an almost complete circle around the rotunda described above. These structures were probably cold weather structures, but they may have been used in moderate temperature also. While this structure type has not been widely recognized in the Southeast up to this point, the number of these structures should make their existence and general acceptance more widespread as a legitimate prehistoric structure type. One or two could be ignored; thirty-four of them on a single site cannot be ignored.

The third structure form at the Joe Bell site probably consisted of light arbors, wind breaks, and sheds made by placing a few posts into the ground and building the necessary light structure onto this simple frame. These were probably warm weather structures and were designed more to protect from the intensity of summer sun rays and perhaps rain more than anything else. The profusion of posts on the site prohibits picking out single buildings, although a portion of one is certainly represented just east of Feature 7 in the northern part of the village. A few of the posts found on the site may be the remains of slightly more substantial structures, but it is not possible to segregate these at this time. In any event, these summer sheds would have been used for cooking and sleeping as well as other village activities.

It is somewhat surprising that there were no remains of substantial square or rectangular non-semisubterranean wattle and daub structures found at 9Mg28. They were certainly present in the previous Dyar and Duvall Phases in the Oconee Valley (Smith 1981). There are several possible reasons to explain this. First, there may be a few structures of this more traditional type located outside the one acre portion of the site excavated but within the 1 1/2 acre estimate maximum site area. I don't think this is likely, though. As pointed out above, it is also possible that some of the many posts recorded (Figure 50) are the remains of the bases of those houses with the floors having been plowed away. No obvious patterns exist, however. It seems therefore that there simply were none of these structures associated with the Bell

Phase occupation. It must be admitted that although there are none of these classic square wattle and daub houses at the Joe Bell site this does not mean that there might not have been structures of this type at other Bell Phase sites in the Oconee Valley.

Of perhaps greater significance, structures of this type are, in fact, rare on archaeological sites of the 17th and 18th centuries throughout Georgia and Alabama, that is the heartland of the southeastern Muskogean-spaking groups of the time. Sites such as 9Tp9 (The Burnt Village) and the Childersburg site in Alabama, both of which date to this broad period and on which extensive excavations were conducted, have failed to yield evidence of such houses (Huscher 1971, DeJarnette and Hansen 1960). Further, Prokopetz (1974) has shown that houses of this type found at Macon Plateau and ascribed by Mason (1963) to the historic period in fact belong to the much earlier Macon Plateau period. The situation at most other 17th and 18th century sites examined in detail for this area is much the same. Thus it is not too surprising that no structures of this type were found at 9Mg28. The use for these square to rectangular wattle and daub houses in earlier periods was primarily that of a cold weather house. If the small semi-subterranean earthlodges of the type found at 9Mg28 were cold weather structures, as they must have been, there would have been no need for the former structure type. The labor necessary to construct a small semi-subterranean earthlodge would probably have been substantially less than that required to build an above ground wattle and daub square house. It is also interesting to note that this apparent change in winter structure form coincides roughly with the end of mound construction following the explorations of the 16th century Spanish in this area. Both of these changes may represent a part of the simplification of Indian societies which always occurred after contact with the early Spanish. None of this should be taken to imply that no traditional houses were made during this late period, because some probably were in many places, but simply to point out that an apparent transition was taking place.

The ceramics found at the Joe Bell site form the largest and best known collection of ceramics for this time period in the Upper Oconee River valley. Some 118 vessels were reconstructed and were analyzed in detail. It can be said that this collection has a wide range of shapes and forms, far more than was anticipated based upon our knowledge of ceramics from similar time periods in other parts of the state. The pottery of the Bell Phase is either plain or incised, with no stamped pottery. The execution of the incised designs is quite good, some being excellent, probably the best incised pottery thus far discovered in the state. As a collection, this material seems to be present only in the upper part of the Oconee River valley, and occurs from north of Milledgeville to the head waters of the rivers. It does not occur outside this area or on other river drainages. All of it, even the best decorated, appears to be utilitarian ware. None was found with the burials at 9Mg28 and none are of what might be called "ceremonial" forms. The vessels range from very small to very large. Indeed, the variety of forms is probably as great as that known from any prehistoric site in the Southeast. The exact number of size/shape classes is uncertain, but the analyses presented earlier give many possibilities for further research.

Lithic material for the Bell Phase component at 9Mg28 is not particularly common, although it is difficult to know what lithic material from the site indeed belongs to this component. There were no small triangular projectile points, or for that matter, any points that can unequivocally be assigned to this phase. Likewise, scrapers and other stone tools are not common. Cane was found growing at the site and may have been used for knives and weapons, but this is practically unprovable.

All of the burials at the site were in very small pits, the body being tightly flexed and lying on the right side. Grave goods were almost absent, only two beads being found. This contrasts strongly with burials at many post-A.D. 1600 sites in the Georgia area, where goods, often trade materials, were commonly placed with the dead person. The lack of goods, however, helps reinforce the egalitarian nature of the society: that is, nobody received more in death than anyone else. This certainly contrasts with earlier chiefdom level societies, although based upon the evidence from the Dyar site (Smith 1981) the degree of social stratification in the Oconee River area was never as great as it had been at earlier times in Northwest Georgia.

Feature 1 is taken to be evidence of a Busk ceremonial. It is not at all surprising that these people celebrated the harvest season. Virtually every historically recorded group of Indians in the Southeast also did. What is rewarding is that one small aspect of it which has apparently never been recovered archaeologically before is now recorded.

There are no real clues as to why or when the Joe Bell site was finally abandoned. The site was apparently vacated long before the 1715 Yamasee War. No post 1680 European trade items were at Joe Bell or in the Wallace Reservoir. Certainly disease could have played a part in the depopulation. It is also not possible to say with certainty to what ethnic group the inhabitants of the site belonged. The most likely choice would be the Oconees (Swanton 1946:165).

The name of the river itself is of course Oconee and no other name is available to apply to these people in the historic literature. Two problems exist with this identity however. First, Swanton believed that the Oconees as a named tribe did not move to the river which now bears their name until very late in the 17th century. Mason (1963:15) points out that many of the Creek groups on the Chattahoochee River moved further to the east after 1689 to get closer to the source for English trade goods at Charleston, and also to escape the control of the Spanish, from whom they obtained little that they wanted. Presumably the trading post at Macon (Kelly 1939) was founded to take advantage of this situation. Swanton believes the Oconees first moved to this area at that time, some 60 years after 9Mg28 was occupied and abandoned. A second problem grows out of excavations carried out in the 1930's under the direction of A.R. Kelly at a site near Milledgeville which was purported to be Oconee Old Town, a major settlement of that group. Although the results of these excavations have not been published, an examination of the recovered ceramic material stored in the Southeast Archaeological Center in Tallahassee shows it to be quite different from material from 9Mg28 and from the Wallace Reservoir. It is similar to material from the Macon and Chattahoochee River areas in the late 17th and early 18th century. This information supports Swanton's belief that the Oconees were late to arrive in central Georgia, and this makes it difficult to assign the term Oconee to the inhabitants of 9Mg28. Their ethnic identity thus remains an open question.

There are still many questions to be asked about the Bell Phase peoples of Northeast Georgia. The settlement patterns across the landscape for this period are only beginning to be researched. How do they differ from the preceding Dyar Phase? Are these smaller specialized subsistence sites? What language did the people speak? When and why was the Upper Oconee River abandoned? How were these people in A.D. 1630 related to "Creeks" in Central Georgia and to Cherokee-speaking people to the north? Is there an actual genetic relationship between the people of the Dyar Phase and the Bell Phase, or were outside forces other than Europeans involved?

Certainly the work at the Joe Bell site has told us much about the lifeways of people in this area in the 1600's, and our general knowledge is now much better. Future research at sites outside the Lake Oconee project as well as continued analysis of the other recovered materials from the project proper should allow our knowledge of these people to continue to increase.

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## Appendix A

| Provenience | Location |
|---|---|
| 1 | Feature 5 |
| 2 | 50 Foot Square 8, shovel scraping |
| 3 | 50 Foot Square 9, shovel scraping |
| 4 | 50 Foot Square 10, shovel scraping |
| 5 | 50 Foot Square 11, shovel scraping |
| 6 | Post Molds |
| 7 | Feature 7 |
| 8 | Feature 8 |
| 9 | Feature 9 |
| 10 | Feature 10 |
| 11 | 50 Foot Square 12, shovel scraping |
| 12 | Feature 12 |
| 13 | Feature 13 |
| 14 | General Surface Collection |
| 15 | Area 1 |
| 16 | Area 2 |
| 17 | Feature 15 |
| 18 | 50 Foot Square 2, shovel scraping |
| 19 | Feature 16 |
| 20 | 50 Foot Square 3, shovel scraping |
| 21 | 50 Foot Square 1, shovel scraping |
| 22 | 50 Foot Square 5, shovel scraping |
| 23 | Feature 18 |
| 24 | Feature 24 |
| 25 | Feature 19 |

| | |
|---|---|
| 26 | 50 Foot Square 4, shovel scraping |
| 27 | 50 Foot Square 6, shovel scraping |
| 28 | Feature 28 |
| 29 | Feature 30 |
| 30 | Burial 1, Feature 36 |
| 31 | Feature 37 |
| 32 | 50 Foot Square 7, shovel scraping |
| 33 | Feature 42 |
| 34 | Feature 43 |
| 35 | Burial 2, Feature 31 |
| 36 | Burial 3, Feature 34 |
| 37 | $C_{14}$ Samples |
| 38 | Pollen Samples |
| 39 | Post Hole 622 |

## APPENDIX B

A total of six Radiocarbon-14 determinations have been made on material from the Joe Bell site. Of these only two are usable, the other four being grossly out of line. The two usable dates are:

UGA 140, Charcoal, Feature 1, 1670±70 A.D.

and

UGA 252, Goniobasis shells, Feature 1, 1695±55 A.D.

The bristlecone pine corrected dates for these two samples are 1620 A.D. and 1630 A.D. respectively (Ralph et al. 1973). These corrected dates agree completely with the artifactual materials from the Bell Phase component of the site and are judged to be an accurate estimate of the period of occupation. These two samples were gathered and dated in 1969.

The four dates that are deemed useless are as follows.

UGA 1832, Charcoal, Feature 8, 660±95 A.D.
UGA 1833, Charcoal, Feature 10, 295±225 A.D.
UGA 1834, Charcoal, Feature 5, 1310±90 A.D.
UGA 1841, Charcoal, Feature 9, 335±65 B.C.

The third of these, UGA 1834 must be wrong because European glass beads, known to date after 1570 A.D. (Marvin Smith, Personal Communication), occurred in this feature. Features 8, 9, and 10 all are virtually identical in forms, are adjacent to each other, and certainly all date to the same time period. The possibility of a Woodland date, even if these three Carbon-14 were consistent (which they are not) is extremely remote based upon the discussion of the features in the text.

Appendix C

Pottery Vessel Variable List

| Variable Number | Description |
|---|---|
| 1 | Feature in which vessel found |
| 2 | Proportion of vessel present |
| 3 | Maximum height |
| 4 | Lip diameter |
| 5 | Maximum diameter |
| 6 | Vertical distance from lip to point of maximum diameter |
| 7 | Neck diameter |
| 8 | Vertical distance from lip to point of neck measurement |
| 9 | Shoulder diameter |
| 10 | Vertical distance from lip to shoulder |
| 11 | Bottom diameter |
| 12 | Vessel volume |
| 13 | Thickness at rim |
| 14 | Thickness at mid-height |
| 15 | Thickness at base |
| 16 | Temper amount |
| 17 | Temper partical size |
| 18 | Bottom shape |
| 19 | Bottom wear |
| 20 | Exterior color |
| 21 | Interior color |
| 22 | Fire clouds |
| 23 | Inner surface texture |
| 24 | Outer surface texture |
| 25 | Interior crusty deposits |
| 26 | Vertical distance from lip to top of crusty deposits |
| 27 | Rim form |
| 28 | Rim shape |

Appendix C (continued)

| Variable Number | Description |
|---|---|
| 29 | Lip shape |
| 30 | Rim strip width |
| 31 | Distance between nodes on rim strips |
| 32 | Plain or incised |
| 33 | Percentage of outer surface covered with incised lines |
| 34 | Average width of incised lines |
| 35 | Average distance between incised lines |
| 36 | Incised zone lines |
| 37 | Width of incised band |
| 38 | Vertical distance from lip to top of incised band |
| 39 | Proportion of curved lines in incised design |
| 40 | Number of lines forming the incised design |
| 41 | Number of design repetitions around vessel circumference |
| 42 | Design symmetry |
| 43 | Smoothing over design |
| 44 | Design quality |
| 45 | Number of sherds per vessel fragment |
| 46 | Weight of vessel fragment |

## APPENDIX D

This Appendix lists the data for the pottery vessels from this site. The first eight pages list the data for all vessels on Variables 1 through 21. The second eight pages list the data for all vessels on Variables 22 through 46. Cells with dashes only indicate that that variable either does not apply to or that it was not possible to determine for that vessel. Underlined values are best estimates.

Appendix D

Variables

| vessel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 80 | 27 | 26.6 | 26.6 | 0 | - | - | - | - | - | 8400 | 8 | 6 | 11 | 2 | 2 | 1 | 2.5 | | |
| 2 | 1 | 85 | 18.8 | 34.9 | 34.9 | 0 | - | - | - | - | 8.5 | 9200 | 8 | 8 | 8 | 1.5 | 2 | 2 | 1.5 | | |
| 3 | 1 | 65 | 16.5 | 8.5 | 17.7 | 8.5 | - | - | - | - | 6.8 | 3800 | 6 | 4 | | 1.5 | 1 | 2 | 2 | | |
| 4 | 1 | 99 | 7.4 | 9.7 | 12.0 | 1.7 | - | - | - | - | 4.5 | 400 | 5 | | | 2 | 1 | 2 | 2 | | |
| 5 | 1 | 98 | 14.2 | 26.3 | 31.9 | 0 | 29 | 1.7 | - | - | 9.0 | 4750 | | | | 1 | 1 | 2 | 2.5 | | |
| 6 | 1 | 90 | 21.5 | 30.4 | 33.1 | 2 | - | - | - | - | 10.0 | 9225 | 7 | 8 | 10 | 2.5 | 2 | 2 | 3 | | |
| 7 | 1 | 90 | 30.7 | 15.8 | 19.0 | 19.5 | 13.6 | 2.5 | - | - | 7.0 | 5400 | 6 | 6 | | 1 | | 2 | 1 | | |
| 8 | 1 | 80 | 28.0 | 37.3 | 42.3 | 4.0 | - | - | - | - | 10.0 | | 6 | 7 | 9 | | | 2 | 2 | | |
| 9 | 1 | 35 | 10.5 | 14.9 | 17.6 | 1 | 13.3 | 5.0 | - | - | - | | 4 | 5 | 6 | 1.5 | 1 | - | - | | |
| 10 | 1 | 55 | 40 | 35 | 35 | 0 | 27.9 | 11.0 | 29.6 | 15.5 | - | | 7 | 10 | - | 2 | 2 | - | - | | |
| 11 | 1 | 50 | 25 | 29.7 | 29.7 | 0 | - | - | - | - | - | | | | - | 2 | 1 | - | - | | |
| 12 | 1 | 95 | 11.1 | 29.9 | 29.9 | 0 | - | - | - | - | 7.5 | 3150 | | | | 1.5 | 1 | 2 | 1 | | |
| 13 | 1 | 98 | 24.4 | 36.4 | 39.5 | 3.5 | - | - | - | - | 9.5 | 15675 | | | | 2 | 1 | 2 | 2 | | |
| 14 | 1 | 65 | 19.3 | 35.0 | 35.0 | 0 | - | - | - | - | 8.5 | 16000 | | | | 2 | 2 | 2 | 1.5 | | |
| 15 | 1 | 50 | 21.9 | 31.0 | 31.0 | 0 | 23.6 | 7.5 | 25.0 | 10.5 | 7.0 | | | | | 2.5 | 2.5 | 2 | 2.5 | | |

Appendix D (continued)

Variables

| vessel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 1 | 95 | 29.5 | 42.1 | 42.1 | 0 | 31.9 | 9.0 | 32.3 | 14.5 | 10.5 | 17850 | | | | 1 | 2 | 2 | 3 | | |
| 17 | 1 | 95 | 25.1 | 41.0 | 43.8 | 3.5 | - | - | - | - | 10.8 | 20950 | | | | 2 | 1 | 2 | 2 | | |
| 18 | 1 | 92 | 26 | 35 | 35 | 0 | - | - | - | - | - | 11400 | | | | 2.5 | 3 | 1 | 1 | | |
| 19 | 1 | 40 | 47 | 42.6 | 52.6 | 20 | 40.2 | 3.5 | - | - | - | | | 5 | | 1 | 1 | - | - | | |
| 20 | 1 | 55 | 19.8 | 35.8 | 35.8 | 0 | - | - | - | - | 9.5 | 15500 | | | | 2 | 2 | 2 | 3 | | |
| 21 | 1 | 50 | 22.7 | 28.2 | 30.8 | 4.0 | - | - | - | - | 10.0 | 15600 | | | | 3 | 1 | 2 | 1.5 | | |
| 22 | 1 | 45 | 25 | 27.6 | 27.6 | 0 | - | - | - | - | - | | | | - | 1 | 2.5 | - | - | | |
| 23 | 1 | 40 | 21 | 31 | 36.4 | 3.7 | - | - | - | - | - | | | | | 3 | 3 | - | - | | |
| 24 | 1 | 25 | 22 | 34 | 38 | 4.5 | - | - | - | - | - | | | | - | | 2 | - | - | | |
| 25 | 1 | 50 | 17.9 | 27.8 | 32.2 | 3.0 | - | - | - | - | - | | | | | 1.5 | 1.5 | 2 | 3 | | |
| 26 | 1 | 90 | 39.4 | 21.5 | 22.7 | 20.5 | 18.7 | 3.5 | - | - | 8.5 | | | | | 2 | 2 | 2 | 3 | | |
| 27 | 1 | 65 | 12.0 | 16.3 | 18.3 | 2.0 | - | - | - | - | 7.0 | 1600 | | | | 1.5 | 2 | 2 | 2.5 | | |
| 28 | 1 | 25 | 12.2 | 38 | 38 | 0 | - | - | - | - | | | | | | 2 | 1 | 2 | 2.5 | | |
| 29 | 1 | 20 | 28 | 32 | 32 | 0 | - | - | - | - | | | | | - | 2 | 1.5 | - | - | | |
| 30 | 1 | 25 | 25 | - | 40 | - | - | - | - | - | 11.0 | | - | | | 2.5 | 1.5 | 2 | 3 | | |

Appendix D (continued)

Variables

| vessel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 1 | 25 | 20 | - | 35 | - | - | - | - | - | 11.0 | | - | | | 2 | 2 | 2 | 1.5 | | |
| 32 | 1 | 30 | 19 | 10.5 | 20.7 | 8.5 | - | - | - | - | - | | | | | 1.5 | 1.5 | 2 | - | | |
| 33 | 1 | 80 | 26.5 | 39.4 | 43.4 | 3.5 | - | - | - | - | 10.5 | | | | | 1.5 | 1.5 | 2 | 1.5 | | |
| 34 | 1 | 35 | 20 | 26 | 33 | 4.0 | - | - | - | - | - | | | | | 2 | 2.5 | - | - | | |
| 35 | 1 | 90 | 21 | 36.7 | 40.7 | 3.8 | - | - | - | - | 11.0 | 16950 | | | | 2 | 1 | 2 | 2.5 | | |
| 36 | 1 | 20 | 20 | 30 | 32.4 | 3.0 | - | - | - | - | - | | | | - | 3 | 1 | - | - | | |
| 37 | 1 | 15 | 30 | 29 | 32.2 | 3.2 | - | - | - | - | - | | | | - | 2 | 2 | - | - | | |
| 38 | 1 | 15 | 30 | 29 | 29 | 0 | - | - | - | - | - | | | | - | 3 | 2.5 | - | - | | |
| 39 | 1 | 15 | 30 | 32 | 32 | 0 | - | - | - | - | - | | | | - | 2 | 2.5 | - | - | | |
| 40 | 1 | 15 | 30 | 30 | 30 | 0 | - | - | - | - | - | | | | - | 3 | 3 | - | - | | |
| 41 | 1 | 8 | - | 18 | 30 | 13 | 16 | 2.5 | - | - | - | | | | | 1 | 1.5 | - | - | | |
| 42 | 1 | 10 | 20 | 25 | 27 | 3.5 | - | - | - | - | - | | | | - | 2 | 1.5 | - | - | | |
| 43 | 1 | 20 | 15 | 24 | 28 | 3.0 | - | - | - | - | - | | | | - | 3 | 2.5 | - | - | | |
| 44 | 1 | 5 | 25 | 37 | 40.5 | 3.0 | - | - | - | - | - | | | | | 2 | 2 | - | - | | |
| 45 | 1 | 5 | - | 29 | - | 0 | - | - | - | - | - | | | | - | 3 | 2.5 | - | - | | |

Appendix D (continued)

Variables

| vessel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | 1 | 20 | 19 | 30 | 34 | 4.5 | - | - | - | - | - | | | | - | 2.5 | 3 | - | - | | |
| 47 | 1 | 25 | 21 | 24 | 28 | 5.0 | - | - | - | - | - | | | | - | 3 | 3 | - | - | | |
| 48 | 1 | 5 | - | 29 | - | - | - | - | - | - | - | | | | | 2.5 | 2 | - | - | | |
| 49 | 1 | 10 | 13 | 37 | 38 | 1 | - | - | - | - | - | | | | | 1.5 | 1.5 | - | - | | |
| 50 | 1 | 10 | 29 | - | - | - | - | - | - | - | - | | | | | 2 | 2 | - | - | | |
| 51 | 1 | 15 | - | - | - | - | - | - | - | - | 8.6 | | | | | 2.5 | 3 | 2 | 2 | | |
| 52 | 1 | 1 | - | 32 | - | - | - | - | - | - | - | | | | | 1 | 1 | - | - | | |
| 53 | 1 | 5 | - | 30 | - | - | - | - | - | - | - | | | | | 3 | 2.5 | - | - | | |
| 54 | 1 | 5 | - | 41 | - | - | - | - | - | - | - | | | | | 1.5 | 1 | - | - | | |
| 55 | 1 | 5 | - | 25 | - | - | - | - | - | - | - | | | | | 1.5 | 1 | - | - | | |
| 56 | 1 | 3 | - | 30 | - | - | - | - | - | - | - | | | | | 1.5 | 1 | - | - | | |
| 57 | 1 | 5 | - | 29 | - | - | - | - | - | - | - | | | | | 1.5 | 1 | - | - | | |
| 58 | 1 | 1 | - | 18 | - | - | - | - | - | - | - | | | | | 2 | 1.5 | - | - | | |
| 59 | 1 | 1 | - | - | - | - | - | - | - | - | - | | | | | 1.5 | 1 | - | - | | |
| 60 | 1 | 20 | 17 | 35 | 35 | 0 | - | - | - | - | - | | | | | 2 | 1.5 | - | - | | |

Appendix D (continued)

Variables

| vessel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 61 | 1 | 15 | 21 | 33 | 33 | 0 | - | - | 0 | - | 8.5 | | | | | 1.5 | 1.5 | 2 | 1.5 | | |
| 62 | 1 | 12 | - | 35 | - | - | - | - | - | - | - | | | | | 1 | 1 | - | - | | |
| 63 | 2 | 92 | 23 | 29.5 | 29.5 | 0 | - | - | - | - | - | | | | - | 3 | 2.5 | 1 | 2 | | |
| 64 | 2 | 40 | 30 | 32 | 34 | 12.5 | 27 | 4 | 31 | 13 | - | | | | - | 2 | 2 | - | - | | |
| 65 | 2 | 10 | - | - | 37 | 2 | - | - | 37 | - | - | | | | - | 1 | 1.5 | - | - | | |
| 66 | 2 | 40 | 30 | 30 | 30 | - | 25 | 8 | 26 | 14.5 | - | | | | - | 3 | 2.5 | - | - | | |
| 67 | 2 | 5 | - | 38 | 42 | 3.5 | - | - | - | - | - | | | | - | 2 | 2 | - | - | | |
| 68 | 2 | 10 | - | 32 | 38 | 0 | 36 | 1 | - | - | - | | | | - | 2 | 1 | - | - | | |
| 69 | 2 | 15 | 15 | 35 | 35 | - | 33 | 1.7 | 33.5 | 3.1 | - | | | | - | 1 | 1 | - | - | | |
| 70 | 2 | 20 | 16 | 35 | 35 | - | - | - | - | - | - | | | | - | 2 | 2 | - | - | | |
| 71 | 2 | 60 | 25 | 31 | 31 | - | 23 | 12 | 25 | 16.1 | 12 | | | | | 2 | 1 | 2 | 3 | | |
| 72 | 2 | 10 | 18 | 32 | 33 | 2.2 | - | - | - | - | - | | | | - | 3 | 3 | - | - | | |
| 73 | 2 | 10 | 25 | 29 | 29 | - | - | - | - | - | - | | | | - | 2 | 2.5 | - | - | | |
| 74 | 2 | 20 | 16 | 25 | 28 | 5.0 | - | - | - | - | - | - | | | - | 1 | 2 | - | - | | |
| 75 | 2 | 15 | 18 | 24 | 24 | - | - | - | - | - | - | | | | - | 1 | 1.5 | - | - | | |

Appendix D (continued)

| vessel | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Variables | | | | | | | | | | | | | | | | | | | | |
| 76 | 2 | 15 | 47 | 43 | 53 | 20 | 40 | 3.5 | - | - | - | | | | - | 2 | 2 | - | - | | |
| 77 | 2 | 15 | - | - | 24 | - | - | - | - | - | - | | - | | - | 3 | 1 | - | - | | |
| 78 | 2 | 8 | - | - | - | - | - | - | - | - | - | | | | - | 2 | 2.5 | - | - | | |
| 79 | 5 | 80 | 25.5 | 29.6 | 29.6 | 0 | - | - | - | - | - | | | | | 1 | 1 | 1 | - | | |
| 80 | 5 | 70 | 24 | 14.2 | 14.2 | 0 | 11.4 | 2.5 | 16.7 | 13.4 | - | | | | | 1.5 | 1 | 2 | 2 | | |
| 81 | 5 | 45 | 22 | 29 | 31.5 | 3.2 | - | - | 31.5 | 3.2 | 8 | | | | | 1.5 | 1.5 | 2 | 1 | | |
| 82 | 5 | 35 | - | 36 | 44 | 2.9 | - | - | 44 | 2.9 | - | | | | | 2 | 1 | - | - | | |
| 83 | 5 | 60 | 26 | 39 | 39 | 0 | - | - | - | - | - | | | | | 1 | 1 | - | - | | |
| 84 | 5 | 50 | - | 7 | 30 | 8 | - | - | 30 | 8 | - | | | | | 2 | 1 | - | - | | |
| 85 | 5 | 20 | - | 36 | 46 | 3.1 | - | - | 46 | 3.1 | - | | | | | 3 | 3 | 2 | 3 | | |
| 86 | 5 | 10 | - | 33 | 33 | 0 | - | - | - | - | - | | | | | 2 | 2 | - | - | | |
| 87 | 5 | 50 | 26.5 | 29.5 | 29.5 | 0 | - | - | - | - | - | | | | | 1 | 1.5 | 1 | 2 | | |
| 88 | 5 | 70 | 21 | - | 18.8 | - | - | - | 18.8 | - | 5 | | | | | 3 | 2 | 2 | 3 | | |
| 89 | 5 | 25 | 25.5 | 28 | 28 | 0 | - | - | - | - | - | | | | | 2 | 1 | - | - | | |
| 90 | 5 | 10 | - | 33 | 33 | 0 | - | - | - | - | - | | | | | 2.5 | 2.5 | - | - | | |

Appendix D (continued)

| vessel | Variables 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91 | 5 | 5 | - | 30 | 30 | - | - | - | - | - | - | | | | | 1 | 1.5 | - | - | | |
| 92 | 5 | 5 | - | 37 | 37 | - | - | - | - | - | - | | | | | 1 | 1 | - | - | | |
| 93 | 5 | 2 | - | 38 | 38 | - | - | - | - | - | - | | | | | 2.5 | 1.5 | - | - | | |
| 94 | 5 | 5 | - | 28 | 36 | 2.9 | - | - | 36 | 2.9 | - | | | | | 3 | 3 | - | - | | |
| 95 | 5 | 30 | - | 32 | 32 | - | - | - | - | - | - | | | | | 1 | 1 | - | - | | |
| 96 | 5 | 10 | - | - | - | - | - | - | - | - | 8.5 | | | | | 2.5 | 2 | 2 | 2 | | |
| 97 | 5 | 10 | - | - | - | - | - | - | - | - | 9 | | | | | 1 | 1 | 2 | 3 | | |
| 98 | 5 | 10 | - | - | - | - | - | - | - | - | - | | | | | 2 | 2.5 | 1 | 1 | | |
| 99 | 5 | 2 | - | 32 | 40 | 3.3 | - | - | 40 | 3.3 | - | | | | | 2.5 | 1 | - | - | | |
| 100 | 5 | 2 | - | 37 | 45 | 3.8 | - | - | 45 | 3.8 | - | | | | | 1 | 1 | - | - | | |
| 101 | 5 | 1 | - | 14 | - | - | - | - | - | - | - | | | | | 1 | 1.5 | - | - | | |
| 102 | 5 | 1 | - | 15 | - | - | - | - | - | - | - | | | | | 1 | 1 | - | - | | |
| 103 | 5 | 1 | - | 22 | - | - | - | - | - | - | - | | | | | 3 | 2.5 | - | - | | |
| 104 | 5 | 1 | - | 10 | - | - | - | - | - | - | - | | | | | 2 | 2 | - | - | | |
| 105 | 5 | 3 | - | 32 | - | - | - | - | - | - | - | | | | | 3 | 3 | - | - | | |

Appendix D (continued)

| vessel | Variables 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 106 | 5 | 3 | - | 42 | - | - | - | - | - | - | - | | | | | 3 | 2.5 | - | - | | |
| 107 | 5 | 35 | - | - | - | - | - | - | - | - | - | | | | | 3 | 1.5 | 1 | 2 | | |
| 108 | 15 | 98 | 18.5 | 30 | 34 | 2.5 | - | - | 34 | 2.5 | 5.5 | | | | | 1 | 1 | 2 | 3 | | |
| 109 | 15 | 50 | 9.4 | 16 | 16 | - | 14.5 | 1.8 | 15 | 3.5 | 6 | | | | | 2 | 2 | 2 | 2 | | |
| 110 | 15 | 5 | - | 32 | 40 | 2.9 | - | - | 40 | 2.9 | - | | | | | 2 | 1 | - | - | | |
| 111 | 15 | 5 | - | 44 | - | - | - | - | - | - | - | | | | | 1 | 1.5 | - | - | | |
| 112 | 15 | 1 | - | 36 | - | - | - | - | - | - | - | | | | | 1 | 1 | - | - | | |
| 113 | 15 | 1 | - | 30 | - | - | - | - | - | - | - | | | | | 3 | 2 | - | - | | |
| 114 | 19 | 60 | 27 | 29 | 29 | 0 | 25 | 2.5 | 28 | 12.5 | - | | | | | 3 | 2.5 | - | - | | |
| 115 | 12 | 25 | - | 36 | 36 | - | 33 | 2.2 | 34 | 10 | - | | | | | 2 | 2 | - | - | | |
| 116 | 18 | 15 | - | 34 | 34 | - | - | - | - | - | - | | | | | 3 | 3 | - | - | | |
| 117 | prov 39 | | | | | | | | | | | | | | | | | | | | |
| 118 | prov 39 | | | | | | | | | | | | | | | | | | | | |

## Appendix D (continued)

Variables

| vessel | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 2 | 3 | | | 4 | 3 | 2 | 2.0 | 1.0 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 49 | 1902 |
| 2 | 2 | 1 | 2 | | | 1 | 2 | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 19 | 2233 |
| 3 | 2.5 | 1 | 1 | | | 1 | 1 | 2 | - | - | 2 | 45 | .5 | 3.0 | 4 | 9.5 | .3 | 70 | 44 | 3 | 1 | 3 | 5 | 20 | 682 |
| 4 | 2 | 2 | 2 | | | 1 | 1 | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 331 |
| 5 | 3 | 1 | 2 | | | 5 | - | 1 | - | - | 2 | 3 | 2.5 | 4.0 | 1 | - | - | 5 | 3 | 5 | 1 | 3 | 2 | 21 | 1404 |
| 6 | 1.5 | 2 | 2 | | | 1 | 1 | 2 | - | - | 2 | 15 | 1.5 | 5.0 | 2 | 5.5 | .4 | 70 | 3 | 10 | 1 | 2 | 2.5 | 24 | 2506 |
| 7 | 3 | 2 | 2 | | | 3 | 3 | 2 | 1.9 | .9 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 54 | 1722 |
| 8 | 3 | 1 | 1 | | | 1 | 1 | 1 | - | - | 2 | 15 | .5 | 3.0 | 1 | 5.2 | .1 | 50 | 11 | 10 | 2 | 3 | 4 | 47 | 3342 |
| 9 | 2.5 | 1 | 1 | | | 3 | 3 | 1 | 1.2 | .8 | 2 | 35 | .8 | 2.2 | 2 | 4.2 | 3.7 | 60 | 16 | 7 | 2 | 2 | 2.5 | 13 | 226 |
| 10 | 3 | 1 | 1 | | | 1 | 3 | 2 | - | - | 2 | 30 | 1.2 | 4.0 | 2 | 7.5 | 11.5 | 50 | 11 | 6 | 2 | 2 | 3 | 33 | 2388 |
| 11 | 2 | 2 | 2 | | | 2 | 3 | 2 | 2.3 | 1.5 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 18 | 1453 |
| 12 | 2.5 | 1 | 1 | | | 1 | 2 | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 26 | 1142 |
| 13 | 3 | 1 | 1 | | | 1 | 1 | 1 | - | - | 2 | 15 | .8 | 3.0 | 4 | 5.5 | .40 | 35 | 22 | 6 | 2 | 2 | 4 | 55 | 3526 |
| 14 | 3 | 1 | 2 | | | 1 | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 27 | 2008 |
| 15 | 3 | 2 | 2.5 | | | 3 | 3 | 2 | 1.5 | .9 | 2 | 45 | .8 | 4.0 | 3 | 9.5 | 1.5 | 75 | 19 | 11 | 2 | 2 | 3 | 17 | 1284 |

Appendix D (continued)

Variables

| vessel | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 3 | 2 | 2 | 1 | 7 | 3 | 3 | 1 | 2.0 | 1.5 | 2 | 10 | 1 | 3.0 | 1 | 5.0 | 11.5 | 25 | 10 | 5 | 1 | 2 | 2.5 | 102 | 3840 |
| 17 | 2.5 | 2 | 2 | | | 2 | 1 | 1 | 2.3 | 1.7 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 86 | 4024 |
| 18 | 3 | 2 | 3 | | | 2 | 3 | 1 | 2.3 | 1.2 | 2 | - | - | - | 1 | 2.5 | 2.5 | - | - | - | - | - | - | 77 | 3242 |
| 19 | 3 | 1.5 | 2 | | | 2 | 3 | 3 | 2.7 | 2.0 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 102 | 3686 |
| 20 | 1 | 2 | 2 | | | 3 | 2 | 2 | 2.1 | 1.6 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 38 | 1846 |
| 21 | 2.5 | 2.5 | 1.5 | | | 1 | 1 | 2 | - | - | 2 | 20 | 1.5 | 4.0 | 2 | 4.8 | .5 | 50 | 7 | 9 | 1 | 3 | 3 | 60 | 1811 |
| 22 | 2 | 2 | 2 | | | 3 | 3 | 2 | 2.0 | 1.3 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 49 | 1091 |
| 23 | 2 | 2 | 2 | | | 1 | 1 | 2 | - | - | 2 | 20 | .8 | 3.5 | 2 | 3.5 | .80 | 0 | 8 | 8 | 2 | 3 | 3 | 13 | 786 |
| 24 | 3 | 2 | 2 | | | 1 | 1 | 2 | - | - | 2 | 20 | 1 | 7.0 | 2 | 6.0 | .7 | 60 | 3 | 10 | 1 | 1 | 25 | 25 | 866 |
| 25 | 3 | 1 | 1.5 | | | 1 | 1 | 2 | - | - | 2 | 15 | .8 | 4.0 | 1 | 6.0 | .1 | 50 | 7 | 8 | 2 | 2 | 3 | 22 | 1299 |
| 26 | 2.5 | 2 | 2 | | | 3 | 3 | 2 | 2.0 | 1.5 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 158 | 2951 |
| 27 | 1.5 | 2 | 2 | | | 1 | 1 | 2 | - | - | 2 | 10 | 1.5 | 2.5 | 2 | 2.5 | .4 | 30 | 8 | 12 | 1 | 1 | | 17 | 638 |
| 28 | 2.5 | 1 | 2 | | | 2 | 3 | 1 | 2.5 | 1.0 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 7 | 645 |
| 29 | 2 | 1 | 1 | | | 3 | 3 | 2 | 1.9 | .8 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 538 |
| 30 | 3 | 2.5 | 2 | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 22 | 1221 |

Appendix D (continued)

Variables

| vessel | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 3 | 2.5 | 3 | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 10 | 725 |
| 32 | 2 | 1 | 1 | | | 1 | 2 | 2 | - | - | 2 | 60 | .8 | - | 2 | 11.0 | .3 | 70 | 7 | 3 | - | 3 | 3.5 | 22 | 373 |
| 33 | 2.5 | 1.5 | 1.5 | | | 1 | 1 | 1 | - | - | 2 | 15 | .8 | 2.5 | 4 | 6.0 | .4 | 35 | 25 | 7 | 1 | 3 | 4.5 | 53 | 3877 |
| 34 | 3 | 2 | 2.5 | | | 1 | 1 | 2 | - | - | 2 | 20 | 1.0 | 4.0 | 2 | 6.7 | .8 | 65 | 5 | 10 | 1 | 1 | 3 | 32 | 897 |
| 35 | 3 | 1 | 1 | | | 1 | 1 | 1 | - | - | 2 | 15 | .5 | 2.5 | 4 | 6 | 3.5 | 40 | 37 | 7 | 1 | 3 | 5 | 66 | 4172 |
| 36 | 2 | 3 | 2 | | | 3 | 1 | 2 | 1.9 | .6 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 12 | 701 |
| 37 | 3 | 2 | 1.5 | | | 1 | 1 | 2 | - | - | 2 | 20 | .8 | 2.0 | 4 | 4.7 | .3 | 30 | 18 | 6 | - | 3 | 4 | 14 | 220 |
| 38 | 1.5 | 2 | 3 | | | 2 | 3 | 2 | 2.0 | 1.1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 9 | 375 |
| 39 | 1 | 2 | 3 | | | 2 | 3 | 2 | 2.3 | 1.1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 9 | 455 |
| 40 | 1 | 1.5 | 2.5 | | | 3 | 3 | 2 | 2.4 | 1.2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 13 | 601 |
| 41 | 2.5 | 1 | 1.5 | | | 3 | 1 | 2 | 1.9 | 1.3 | 2 | 30 | 1.1 | 5.0 | 4 | 9.5 | 2.4 | 70 | 4 | - | | 2 | 3 | 8 | 217 |
| 42 | 2.5 | 2 | 2 | 1 | | 1 | 1 | 1 | - | - | 2 | 15 | 1.3 | 5.0 | 2 | 4.5 | .5 | 40 | 6 | 10 | 1 | 3 | 3 | 17 | 289 |
| 43 | 2 | 3 | 3 | | | 3 | 1 | 2 | 2.3 | 1.5 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | 13 | 500 |
| 44 | 2.5 | 2 | 1 | | | 1 | 1 | 2 | - | - | 2 | 20 | .5 | 4.0 | 1 | 6 | .1 | 60 | 10 | 9 | | 3 | 3.5 | 5 | 300 |
| 45 | 1 | 2 | 2 | | | 3 | 3 | 1 | 1.6 | 1.0 | 2 | 30 | 1.2 | 4.0 | 2 | 8.5 | 5.5 | 50 | 11 | - | | 3 | 3.5 | 1 | 250 |

Appendix D (continued)

| vessel | Variables | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
| 46 | 2 | 2 | 2.5 | - | - | 1 | 1 | 2 | - | - | 2 | 15 | 1.0 | 4.0 | 2 | 4.5 | 5 | 30 | 7 | 7 | - | 1 | 2 | 14 | 407 |
| 47 | 2.5 | 2 | 2.5 | | | 1 | 1 | 2 | - | - | 2 | 30 | .8 | 3.0 | 4 | 5.5 | 1.1 | 10 | 19 | 6 | - | 1 | 3 | 19 | 564 |
| 48 | 3 | 2 | 2 | | | 1 | 2 | 1 | - | - | 2 | - | 2 | 3.5 | 4 | 4.8 | .3 | - | 11 | - | - | 1 | 2 | 4 | 146 |
| 49 | 2 | 1.5 | 2 | | | 2 | 1 | 1 | 2.5 | 1 | 1 | | - | - | - | - | - | - | - | - | - | - | - | 2 | 286 |
| 50 | 3 | 1 | 1.5 | | | - | 3 | - | - | - | 2 | 20 | 1.5 | 3.0 | 4.0 | 7.0 | 11.5 | 35 | 19 | - | - | 1 | 2.5 | 49 | 906 |
| 51 | 3 | 1.5 | 2.5 | | | - | - | - | - | - | 2 | - | 1.5 | 3.0 | - | - | - | - | - | - | - | 1 | 2.5 | 15 | 664 |
| 52 | 2 | 1.5 | 2 | | | 2 | 2 | 3 | 2.3 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 103 |
| 53 | 2 | 1 | 2 | | | 3 | 3 | 2 | 2.1 | 1.2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 154 |
| 54 | 3 | 1 | 2 | | | 1 | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 95 |
| 55 | 3 | 2 | 2 | | | 3 | 3 | 1 | 2.2 | .9 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 89 |
| 56 | 3 | 2 | 2 | | | 1 | 1 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 43 |
| 57 | 3 | 2 | 2 | | | 1 | 3 | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 8 | 150 |
| 58 | 2 | 2 | 2 | | | 1 | 2 | 2 | - | - | 2 | - | 1 | - | 2 | - | .6 | - | - | - | - | - | - | 1 | 18 |
| 59 | 1 | 3 | 2 | | | 1 | 1 | 3 | - | - | 2 | - | 1 | 2 | 2 | - | .3 | - | - | - | 2 | 1 | 1 | 3 | 18 |
| 60 | 2.5 | 1 | 2.5 | | | 1 | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 18 | 879 |

Appendix D (continued)

Variables

| vessel | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 61 | 1.5 | 1 | 2.5 | | | 1 | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 11 | 723 |
| 62 | 3 | 1.5 | 2 | | | 1 | 2 | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 7 | 343 |
| 63 | 1 | 2 | 3 | 1 | 3 | 3 | 3 | 2 | 2.3 | 1.4 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 55 | 2077 |
| 64 | 2.5 | 1 | 2 | 2 | - | 2 | 3 | 2 | 2.2 | 1.3 | 2 | 35 | 1.1 | 3.0 | 1 | 11.0 | 0 | 85 | 18 | 8 | - | 3 | 4 | 44 | 1302 |
| 65 | 2 | 3 | 2.5 | 2 | - | - | - | - | - | - | 2 | 10 | 1.0 | 5.0 | 1 | 5.5 | - | 80 | 3 | 11 | - | 2 | 2.5 | 9 | 262.5 |
| 66 | 2 | 2.5 | 2 | 2 | - | 2 | 3 | 2 | 1.9 | 1.0 | 2 | 10 | 1.5 | 2.0 | 2 | 3.6 | 10.8 | 10 | 10 | 7 | - | 3 | 3 | 44 | 961.5 |
| 67 | 2 | 1 | 1 | 2 | - | 1 | 1 | 2 | - | - | 2 | 15 | .5 | 3.0 | 2 | 4.0 | .3 | 30 | 14 | - | - | 3 | 4.5 | 6 | 117 |
| 68 | 3 | 1 | 1 | 2 | - | 5 | - | 1 | - | - | 2 | 3 | 2.5 | 3.0 | 1 | - | - | 5 | 4 | 5 | - | 3 | 2 | 4 | 227.5 |
| 69 | 2 | 1 | 1 | 2 | - | 1 | 3 | 1 | - | - | 2 | 3 | .8 | 2.0 | 1 | 2.3 | .4 | 0 | 8 | - | - | 3 | 4 | 28 | 398 |
| 70 | 2.5 | 1 | 2.5 | 2 | - | 1 | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 15 | 715 |
| 71 | 2.5 | 2 | 2 | 2 | - | 3 | 3 | 1 | 1.8 | 1.1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 87 | 2053 |
| 72 | 3 | 2 | 2.5 | 1 | 3.5 | 3 | 1 | 2 | 2.3 | 1.2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 16 | 359 |
| 73 | 1 | 2 | 3 | 2 | - | 2 | 3 | 2 | 1.6 | 1.2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 7 | 239 |
| 74 | 3 | 2 | 2.5 | 2 | - | 1 | 1 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 5 | 329 |
| 75 | 1.5 | 2 | 2 | 2 | - | 3 | 3 | 1 | 2.2 | 1.5 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 14 | 337.5 |

Appendix D (continued)

| vessel | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76 | 2 | 2 | 3 | 2 | - | 3 | 3 | 2 | 2.4 | 1.5 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 10 | 887 |
| 77 | 2 | 2.5 | 3 | 2 | - | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 49 | 852 |
| 78 | 2 | 2.5 | 2.5 | 2 | - | 1 | 1 | 2 | - | - | 2 | - | .4 | 4.5 | 1 | - | .5 | 35 | 11 | - | - | 2 | 1.5 | 4 | 94 |
| 79 | 3 | 2 | 2 | 1 | | 3 | 3 | 2 | 1.8 | .5 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 33 | 1705.5 |
| 80 | 3 | 2 | 2 | | | 3 | 3 | 2 | 1.7 | .6 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 20 | 835.5 |
| 81 | 3 | 2 | 2.5 | | | 1 | 1 | 1 | - | - | 2 | 10 | 1 | 4 | 2 | - | .5 | 50 | 5 | - | - | 1 | 3 | 35 | 1014.5 |
| 82 | 3 | 2 | 2 | | | 1 | 1 | 1 | - | - | 2 | 20 | .8 | 3 | 2 | - | .4 | 25 | 18 | 9 | 1 | 1 | 3.5 | 54 | 1465.0 |
| 83 | 2 | 2 | 3 | | | 2 | 3 | 2 | 2 | 1.3 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 75 | 1482 |
| 84 | 3 | 1.5 | 1.5 | | | 1 | 1 | 2 | - | - | 2 | 50 | .7 | 3 | 4 | 8.7 | .5 | 50 | 24 | 4 | 1 | 1 | 3.5 | 42 | 524 |
| 85 | 3 | 3 | 2 | | | 1 | 1 | 2 | - | - | 2 | - | 1.5 | 4 | 2 | - | .8 | - | 8 | - | - | 3 | 2.5 | 60 | 965 |
| 86 | 2 | 2 | 2 | | | 6 | 3 | 2 | - | .7 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 23 | 637 |
| 87 | 3 | 1.5 | 1.5 | | | 1 | 3 | 2 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 26 | 1291.5 |
| 88 | 3 | 2 | 2 | | | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 27 | 965 |
| 89 | 3 | 2 | 2 | | | 2 | 3 | 1 | 2.2 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 10 | 867.5 |
| 90 | 3 | 1.5 | 2 | | | 3 | 3 | 1 | 2.1 | .8 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 21 | 412 |

Appendix D (continued)

Variables

| vessel | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91 | 3 | 1.5 | 2 | | | 3 | 3 | 2 | 2.1 | 1.6 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 6 | 268.5 |
| 92 | 3 | 2 | 2 | | | 2 | 3 | 1 | 2.6 | 1.1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 3 | 218.5 |
| 93 | 3 | 1 | 2 | | | 1 | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 125.9 |
| 94 | 2 | 2 | 2 | | | 1 | 1 | 1 | - | - | 2 | - | 1.5 | 4 | 2 | 1.5 | .5 | 30 | - | - | - | 1 | 2 | 7 | 168.5 |
| 95 | 3 | 1.5 | 3 | | | 1 | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 21 | 546 |
| 96 | 3 | 2 | 2 | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 18 | 516.5 |
| 97 | 2 | 2 | 2 | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 14 | 422.5 |
| 98 | 2 | 2 | 2 | | | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | 12 | 411 |
| 99 | 3 | 1.5 | 1 | | | 1 | 1 | 1 | - | - | 2 | - | .4 | 2.5 | 2 | - | .35 | - | 16 | - | - | 1 | 4 | 3 | 67 |
| 100 | 3 | 1 | 1 | | | 1 | 1 | 1 | - | - | 2 | - | .1 | 2.5 | 2 | - | .4 | - | - | - | - | 1 | 4.5 | 1 | 66.5 |
| 101 | 3 | 2 | 2 | | | 1 | 1 | 3 | - | - | 2 | - | .5 | 2.5 | 2 | - | .5 | - | 8 | - | - | 1 | 2 | 7 | 47 |
| 102 | 3 | 2 | 2 | | | 1 | 1 | 2 | - | - | 2 | - | .5 | 2.5 | 2 | - | .65 | - | 9 | - | - | 1 | 1.5 | 5 | 66 |
| 103 | 3 | 1.5 | 2 | | | 3 | 3 | 1 | 2 | .7 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 2 | 45 |
| 104 | 2 | 1 | 2.5 | | | 4 | 3 | 2 | 1.5 | .6 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 14 |
| 105 | 3 | 1.5 | 2 | | | 1 | 2 | 2 | - | - | 2 | - | 1 | 4.5 | 2 | .6 | - | - | - | - | - | 1 | 2 | 14 | 89.5 |

Appendix D (continued)

Variables

| vessel | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 106 | 2 | 1.5 | 2.5 | | | 1 | 2 | 1 | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 8 | 94 |
| 107 | 3 | 1.5 | 2 | | | - | - | - | - | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 17 | 760.5 |
| 108 | 3 | 2 | 2 | | | 1 | 1 | 1 | - | - | 2 | 20 | .9 | 4 | 2 | - | 4 | 0 | 6 | 20 | 1 | 1 | 1.5 | 77 | 1865.5 |
| 109 | 3 | 1 | 1.5 | | | 2 | 3 | 1 | 2 | 1 | 2 | 30 | 1 | 3 | 2 | - | 2.8 | 40 | 12 | 9 | 1 | 1 | 4 | 8 | 316.6 |
| 110 | 3 | 2 | 2 | | | 4 | 1 | 3 | 1.7 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 10 | 232.4 |
| 111 | 3 | 1.5 | 1.5 | | | 2 | 3 | 3 | 2 | 1.5 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 16 | 180 |
| 112 | 1 | 2 | 2 | | | 1 | 2 | 2 | - | - | 2 | - | 2 | 5.5 | - | - | - | - | - | - | - | 1 | 1.5 | 4 | 24.5 |
| 113 | 1 | 2 | 2 | | | 1 | 1 | 1 | - | - | 2 | - | 1 | 2.5 | 2 | - | .4 | - | - | - | - | 1 | 3 | 3 | 27 |
| 114 | 3 | 2 | 2 | | | 4 | 3 | 3 | 2.2 | .8 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 62 | 1912.5 |
| 115 | 3 | 2 | 2 | | | 2 | 3 | 1 | 2.3 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 23 | 805 |
| 116 | 2 | 2 | 2 | | | 4 | 3 | 2 | 2 | 1.2 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 21 | 527.5 |
| 117 | | | | | | | | | | | | | | | | | | | | | | | | | |
| 118 | | | | | | | | | | | | | | | | | | | | | | | | | |

Appendix E

Summary Statistics

Pottery Vessel Variables

| Variable Number | Mean | Median | Mode | Standard Deviation | Coefficient of Variation | Number of Cases |
|---|---|---|---|---|---|---|
| 1 | -- | -- | -- | -- | -- | 116 |
| 2 | 33.343 | 20.188 | 5.0 | 30.855 | .925 | 115 |
| 3 | 22.921 | 22.00 | 25.0 | 7.607 | .332 | 70 |
| 4 | 29.801 | 30.044 | 30.0 | 8.101 | .272 | 103 |
| 5 | 32.278 | 32.96 | 35.0 | 8.436 | .261 | 89 |
| 6 | 3.308 | 2.25 | 0 | 4.92 | 1.487 | 72 |
| 7 | 25.374 | 25.05 | 25.0 | 9.028 | .356 | 19 |
| 8 | 4.495 | 3.467 | 2.5 | 3.333 | .742 | 19 |
| 9 | 31.745 | 31.7 | 25.0 | 8.578 | .270 | 22 |
| 10 | 8.325 | 8.05 | 2.9 | 5.206 | .625 | 20 |
| 11 | 8.640 | 8.55 | 8.5 | 1.924 | .223 | 30 |
| 16 | 1.956 | 1.947 | 2.0 | .696 | .356 | 114 |
| 17 | 1.741 | 1.7 | 1.0 | .676 | .388 | 114 |
| 18 | 1.833 | 1.9 | 2.0 | .377 | .206 | 42 |
| 19 | 2.165 | 2.075 | 2.0 | .703 | .325 | 40 |
| 22 | 2.453 | 2.688 | 3.0 | .636 | .259 | 116 |
| 23 | 1.747 | 1.969 | 2.0 | .535 | .306 | 116 |
| 24 | 2.00 | 2.012 | 2.0 | .540 | .270 | 116 |
| 27 | 1.914 | 1.472 | 1.0 | 1.128 | .589 | 105 |
| 28 | 2.038 | 2.111 | 3.0 | .913 | .448 | 104 |
| 29 | 1.667 | 1.688 | 2.0 | .599 | .359 | 105 |
| 30 | 2.031 | 2.045 | 2.0 | .382 | .188 | 49 |
| 31 | 1.129 | 1.100 | 1.0 | .328 | .291 | 48 |
| 32 | 1.481 | 1.464 | 1.0 | .502 | .339 | 108 |
| 33 | 22.811 | 18.333 | 15.0 | 16.244 | .712 | 37 |
| 34 | 1.051 | .979 | 1.0 | .481 | .458 | 51 |

Appendix E (continued)

| Variable Number | Mean | Median | Mode | Standard Deviation | Coefficient of Variation | Number of Cases |
|---|---|---|---|---|---|---|
| 35 | 3.28 | 3.046 | 3.0 | 1.151 | .351 | 49 |
| 36 | 2.2 | 2.0 | 2.0 | 1.010 | .459 | 50 |
| 37 | 5.838 | 5.5 | 6.0 | 2.415 | .414 | 34 |
| 38 | 4.181 | .583 | .4 | 13.195 | 3.156 | 48 |
| 39 | 41.154 | 40.0 | 50.0 | 23.521 | .572 | 39 |
| 40 | 12.209 | 10.0 | 8.0 | 8.70 | .713 | 43 |
| 41 | 7.967 | 7.5 | 7.0 | 3.29 | .413 | 30 |
| 42 | 1.229 | 1.148 | 1.0 | .426 | .347 | 35 |
| 43 | 1.93 | 1.917 | 1.0 | .904 | .468 | 50 |
| 44 | 2.99 | 2.958 | 3.0 | .987 | .330 | 50 |
| 45 | 24.733 | 16.0 | 1.0 | 26.733 | 1.081 | 116 |
| 46 | 934.79 | 564.25 | 18.0 | 1004.22 | 1.074 | 116 |

## Appendix F

### Pottery Vessel Data Coding Format

| Card Number | Columns | Variable |
|---|---|---|
| 1 | 1-4 | Vessel Number |
| 1 | 6-8 | Feature Number |
| 1 | 10-13 | Percent Present |
| 1 | 15-18 | Maximum Height |
| 1 | 20-23 | Lip Diameter |
| 1 | 25-28 | Maximum Diameter |
| 1 | 30-33 | Lip to Maximum Diameter |
| 1 | 35-38 | Neck Diameter |
| 1 | 40-43 | Lip to Neck Diameter |
| 1 | 45-48 | Shoulder Diameter |
| 1 | 50-53 | Lip to Shoulder Diameter |
| 1 | 55-58 | Bottom Diameter |
| 1 | 60-62 | Temper Amount |
| 1 | 64-66 | Temper Size |
| 1 | 68-70 | Bottom Shape |
| 1 | 72-74 | Bottom Wear |
| 1 | 76-78 | Fire Clouds |
| 2 | 1-3 | Inner Surface Texture |
| 2 | 5-7 | Outer Surface Texture |
| 2 | 9-11 | Rim Form |
| 2 | 13-15 | Rim Shape |
| 2 | 17-19 | Lip Shape |
| 2 | 21-23 | Rim Strip Width |
| 2 | 25-27 | Rim Node Distance |
| 2 | 29-31 | Incising |
| 2 | 33-36 | Percent Incised |
| 2 | 38-40 | Groove Width |
| 2 | 42-44 | Inter-Groove Width |
| 2 | 46-48 | Zone Lines |
| 2 | 50-53 | Zone Width |
| 2 | 55-58 | Lip to Top of Incised Zone |
| 2 | 60-63 | Percent Curved Lines |
| 2 | 65-68 | Number of Scroll Lines |
| 2 | 70-73 | Number of Design Repetitions |
| 3 | 1-3 | Design Symmetry |
| 3 | 5-7 | Smoothing Over Design |
| 3 | 9-11 | Decoration Quality |
| 3 | 13-17 | Number of Sherds |
| 3 | 19-24 | Weight |

# Appendix G

## Vessel Variable Correlation Matrix

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 16 | 17 | 18 | 19 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | -.160 | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| 4 | | | .399 | | | | | | | | | | | | | | |
| 5 | | -.209 | .418 | .754 | | | | | | | | | | | | | |
| 6 | | | .513 | | | | | | | | | | | | | | |
| 7 | | | .523 | .954 | .938 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | |
| 9 | | -.587 | | .591 | .944 | | | | | | | | | | | | |
| 10 | | .463 | .792 | | | | | | | | | | | | | | |
| 11 | -.308 | | .445 | .519 | .509 | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | .606 | | | | | |
| 18 | | | | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | | | | |
| 22 | | | | | .265 | | | | | | | -.170 | -.220 | | | | |

Appendix G (continued)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 16 | 17 | 18 | 19 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | | | | | | | | | | | | .206 | .173 | | | -.194 | |
| 24 | | | | | | | | | | | | .208 | .379 | -.347 | | -.272 | .474 |
| 27 | .199 | | | | | | | | -.410 | .445 | | | | | | -.194 | |
| 28 | .171 | | .416 | | | | | | -.702 | .702 | | | | -.482 | | | |
| 29 | | | .384 | -.192 | | | | | | | | | | | | | .276 |
| 30 | | | | .433 | .444 | | .742 | | | | | | | | | | |
| 31 | | | .368 | .467 | | .452 | .737 | | | | | | | | | | |
| 32 | | | | -.190 | | | | | | | | | | | | | |
| 33 | | | | -.453 | -.364 | | | .571 | | | | | | | | | |
| 34 | | | | | | -.301 | | | | | | | | | | | |
| 35 | | | | | | .270 | | | | | | | | | | | .265 |
| 36 | -.314 | | | -.271 | | | -.675 | | | | | | | | | | |
| 37 | | | | -.355 | | .571 | | | | | | | | | | | -.358 |
| 38 | | | | | -.556 | | | .813 | | .697 | | | | | | | |
| 39 | | | | -.305 | | .405 | -.573 | | | | | | | | | -.318 | |
| 40 | | | | | | | | | | -.586 | | | | | | | -.338 |

Appendix G (continued)

| | 24 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | | | | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | | | | |
| 27 | .169 | | | | | | | | | | | | | | | | |
| 28 | .199 | .577 | | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | | | | |
| 31 | | -.340 | | | .489 | | | | | | | | | | | | |
| 32 | -.331 | -.365 | -.475 | | | | | | | | | | | | | | |
| 33 | | | .297 | .389 | -.390 | | | | | | | | | | | | |
| 34 | | .518 | .275 | | | | | -.288 | | | | | | | | | |
| 35 | .326 | | | | | | | | | | | | | | | | |
| 36 | | | | | -.660 | | | .285 | | -.284 | | | | | | | |
| 37 | | | | .363 | | | | .695 | | | | | | | | | |
| 38 | | .427 | | | | .605 | -.660 | | .261 | | | | | | | | |
| 39 | | | | .367 | | | | .458 | -.271 | | | .700 | -.348 | | | | |
| 40 | -.338 | -.361 | | | | | | .300 | -.410 | | .628 | | | | | | |

Appendix G (continued)

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 16 | 17 | 18 | 19 | 22 | 23 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | .371 | | | | | | | | | | | | | | | | .431 |
| 42 | -.357 | | | | | | | | | .610 | | | | | | | |
| 43 | | .250 | | | | | .670 | | | .640 | | | | | | | |
| 44 | | .287 | | | | | | | | | | | -.241 | | | .269 | -.490 |
| 45 | | .649 | .466 | | | .354 | | | | .477 | | | | | | .170 | |
| 46 | -.198 | .790 | .401 | .298 | .235 | | | .438 | | .611 | .392 | | | | | .162 | |

Appendix G (continued)

| | 24 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | .424 | | | | | | | | | | | -.391 | | | -.378 | | |
| 42 | | | | | | | | | | | | | | | | | |
| 43 | -.425 | .280 | | | | | | | | | | | | | | -.386 | .336 |
| 44 | -.554 | | | -.361 | .722 | | | | -.467 | | .292 | .347 | | | .609 | | |
| 45 | | | | | | .411 | | | | | | | | | | | |
| 46 | | | | | | .440 | | | | | | | | | .295 | | |

Appendix G (continued)

| | 43 | 44 | 45 |
|---|---|---|---|
| 41 | | | |
| 42 | | | |
| 43 | | | |
| 44 | .423 | | |
| 45 | | .301 | |
| 46 | .317 | .361 | .801 |

Appendix H

Number of Cases for Significant Variable Correlations

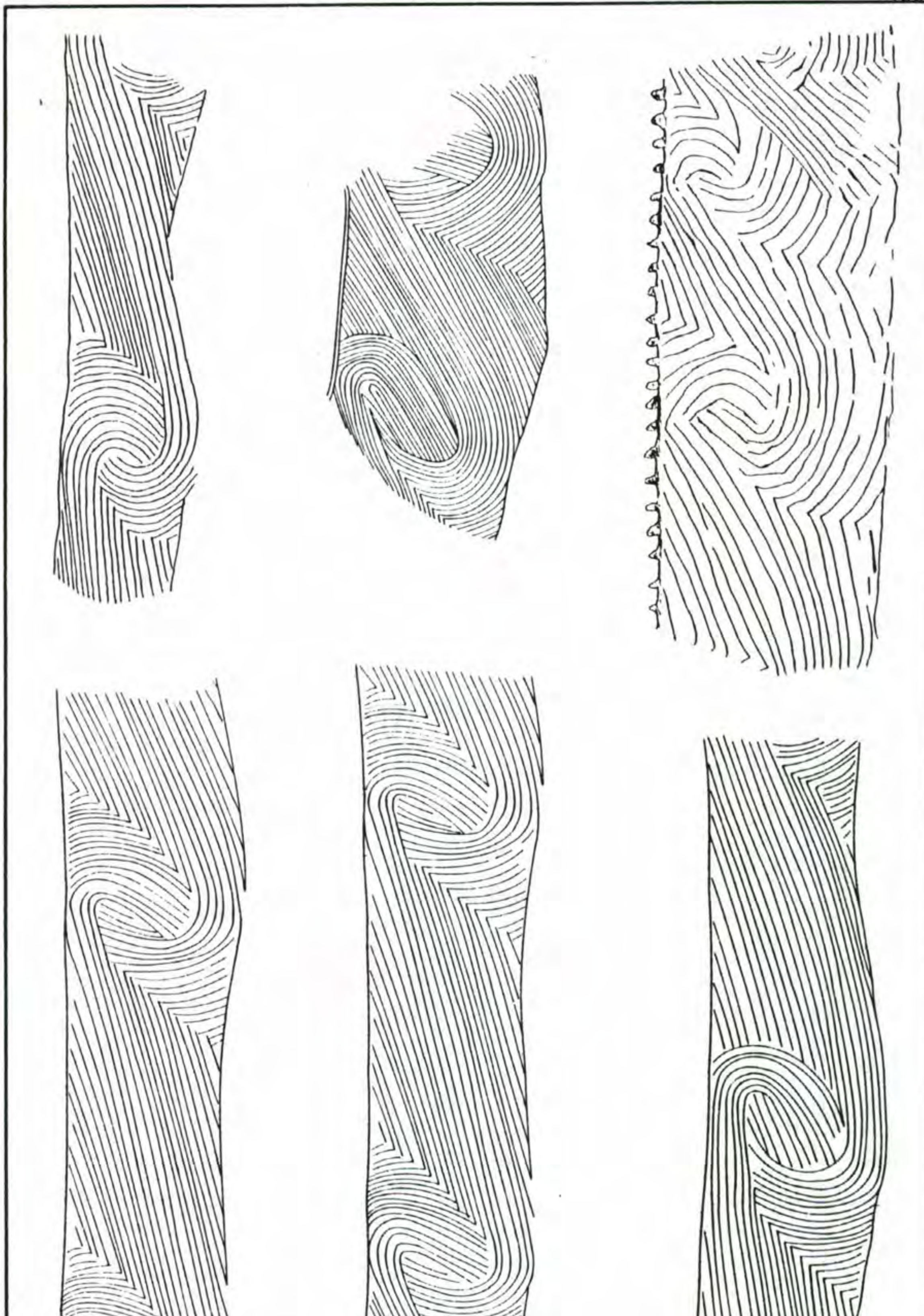
| Variables | N. of Cases | Variables | N. of Cases | Variables | N. of Cases |
|---|---|---|---|---|---|
| 1+2 | 115 | 5+22 | 89 | 17+24 | 114 |
| 1+11 | 30 | 5+30 | 41 | 17+44 | 49 |
| 1+27 | 105 | 5+33 | 35 | 18+24 | 42 |
| 1+28 | 104 | 5+38 | 38 | 18+28 | 38 |
| 1+36 | 50 | 5+46 | 89 | 22+23 | 116 |
| 1+41 | 30 | 6+31 | 33 | 22+24 | 116 |
| 1+42 | 35 | 6+34 | 37 | 22+27 | 105 |
| 1+46 | 116 | 6+35 | 71 | 22+39 | 48 |
| 2+5 | 89 | 6+37 | 30 | 22+44 | 50 |
| 2+9 | 22 | 6+39 | 34 | 22+45 | 116 |
| 2+10 | 20 | 6+45 | 72 | 22+46 | 116 |
| 2+43 | 49 | 7+9 | 11 | 23+24 | 116 |
| 2+44 | 49 | 7+30 | 15 | 23+29 | 105 |
| 2+45 | 115 | 7+31 | 14 | 23+35 | 49 |
| 2+46 | 115 | 7+36 | 11 | 23+37 | 34 |
| 3+4 | 66 | 7+39 | 11 | 23+40 | 43 |
| 3+5 | 69 | 7+43 | 11 | 23+41 | 30 |
| 3+6 | 58 | 8+10 | 11 | 23+44 | 50 |
| 3+7 | 16 | 8+11 | 7 | 24+27 | 105 |
| 3+10 | 12 | 8+33 | 11 | 24+28 | 104 |
| 3+11 | 27 | 8+38 | 9 | 24+32 | 108 |
| 3+28 | 66 | 8+46 | 19 | 24+35 | 49 |
| 3+29 | 66 | 9+10 | 20 | 24+40 | 43 |
| 3+31 | 34 | 9+27 | 20 | 24+41 | 30 |
| 3+45 | 70 | 9+28 | 20 | 24+43 | 50 |
| 3+46 | 70 | 10+11 | 6 | 24+44 | 50 |
| 4+5 | 84 | 10+27 | 20 | 27+28 | 103 |
| 4+7 | 19 | 10+28 | 20 | 27+31 | 48 |
| 4+9 | 20 | 10+38 | 15 | 27+32 | 103 |
| 4+11 | 24 | 10+40 | 9 | 27+34 | 48 |
| 4+29 | 103 | 10+42 | 12 | 27+38 | 47 |
| 4+30 | 49 | 10+43 | 15 | 27+43 | 47 |
| 4+31 | 48 | 10+45 | 20 | 28+32 | 102 |
| 4+32 | 101 | 10+46 | 20 | 28+33 | 34 |
| 4+33 | 35 | 11+46 | 30 | 28+34 | 47 |
| 4+36 | 46 | 16+17 | 113 | 29+33 | 35 |
| 4+37 | 32 | 16+22 | 114 | 29+37 | 32 |
| 4+39 | 36 | 16+23 | 114 | 29+39 | 36 |
| 4+46 | 103 | 16+24 | 114 | 29+44 | 47 |
| 5+7 | 19 | 17+22 | 114 | 30+31 | 47 |
| 5+9 | 22 | 17+23 | 114 | 30+33 | 48 |
| 5+11 | 27 | | | | |

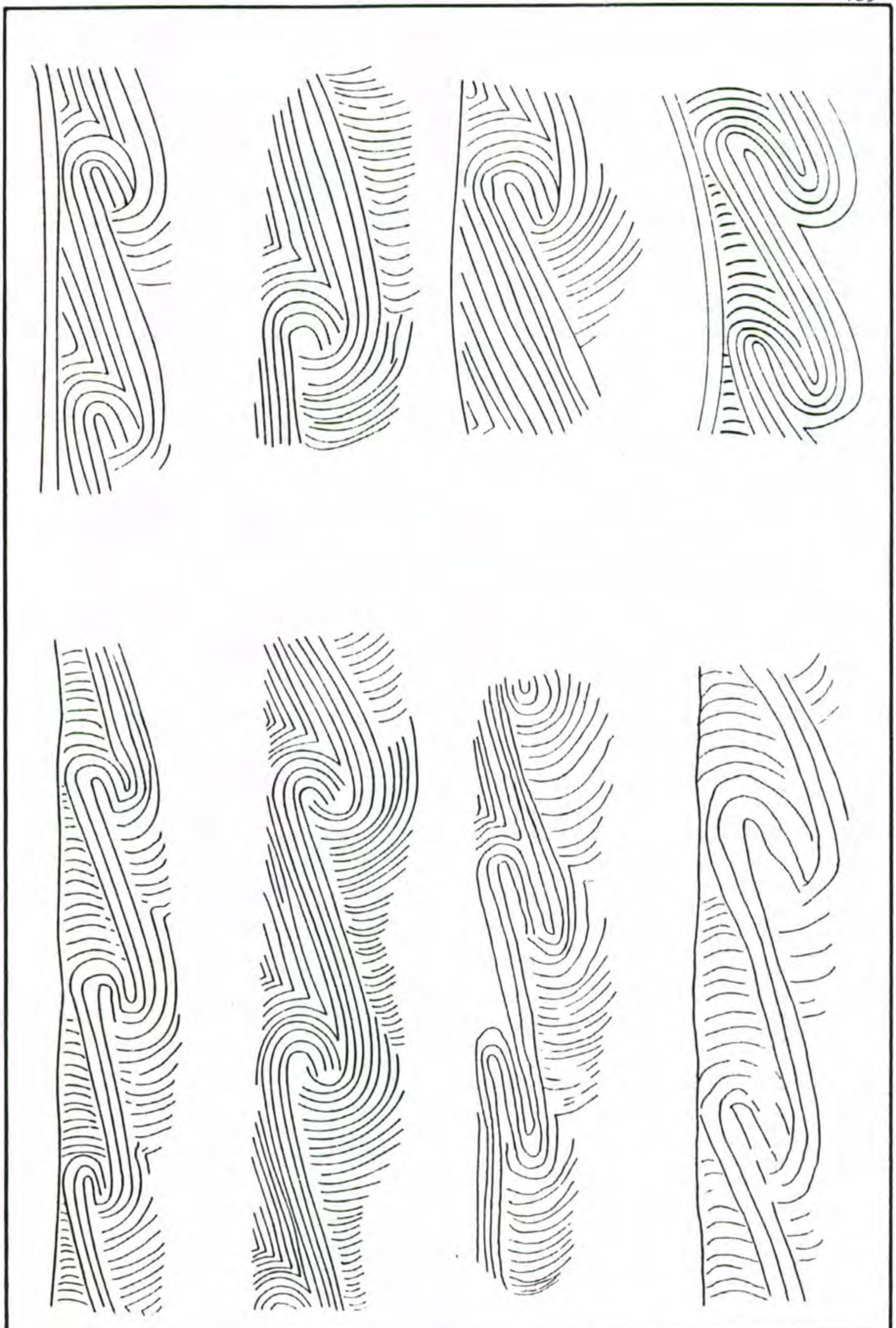
Appendix H (continued)

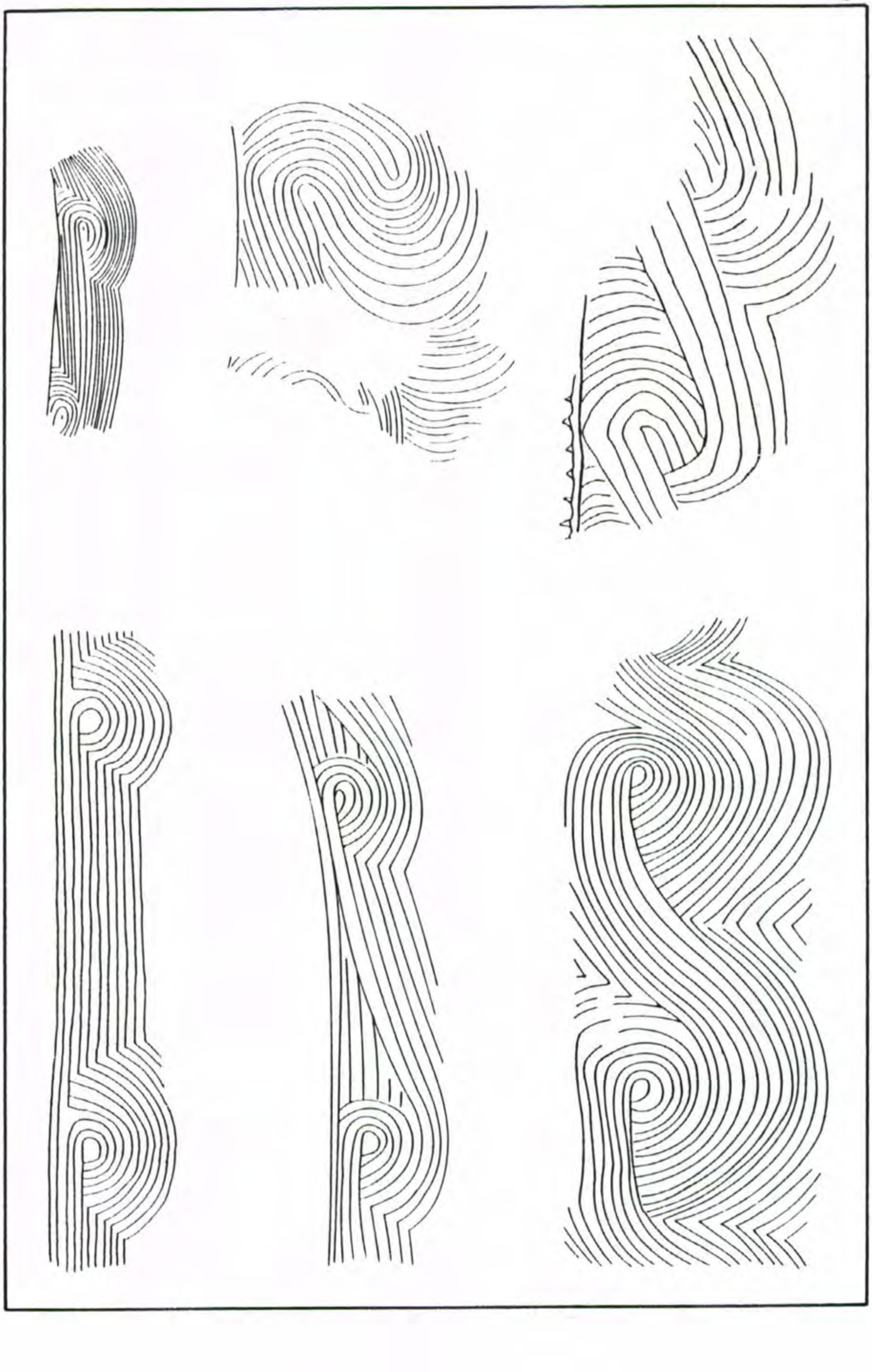
| Variables | N. of Cases |
|---|---|
| 30+36 | 10 |
| 30+44 | 9 |
| 31+38 | 10 |
| 31+45 | 48 |
| 31+46 | 48 |
| 32+38 | 48 |
| 33+35 | 37 |
| 33+36 | 37 |
| 33+37 | 31 |
| 33+39 | 37 |
| 33+40 | 37 |
| 34+38 | 36 |
| 34+39 | 39 |
| 34+40 | 43 |
| 34+44 | 50 |
| 35+36 | 47 |
| 36+40 | 43 |
| 36+44 | 48 |
| 37+39 | 32 |
| 37+41 | 25 |
| 37+44 | 33 |
| 38+39 | 36 |
| 40+41 | 30 |
| 40+44 | 43 |
| 40+46 | 43 |
| 41+43 | 30 |
| 42+43 | 35 |
| 43+44 | 50 |
| 43+46 | 50 |
| 44+45 | 50 |
| 44+46 | 50 |
| 45+46 | 116 |

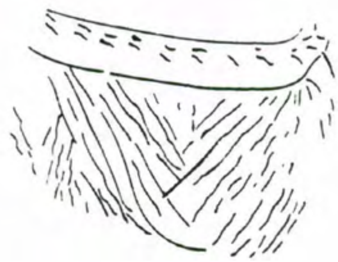
Appendix I

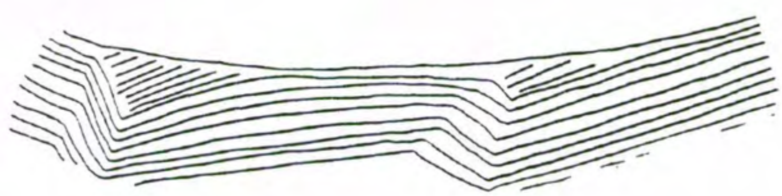
Incised Vessel Designs











## APPENDIX J

The linguistic data on Southeastern Indian containers listed in this appendix is organized in the following manner. For each of the eleven languages listed there are a total of seven pages. The same seven page list of English words is used for each language. The languages are listed alphabetically. While this method causes many blanks in the data from some languages it was selected to allow more east in expansion of the charts with new data as found and to facilitate comparisons bewteen languages. All diacritical marks and orthographies are listed as they were found in the different sources discussed in the text.

| ENGLISH | ATAKAPA |
|---|---|
| Barrel | |
| Basket | ko |
| Basin | cixt, cict, cit |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | kĕlakuā'ts, kĕlokwáts, kĕlakwáts |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | |
| square | |
| Bowl | pāl, ckōp, cixt,cixt pál, cikpál, icpál, hicpál cit, cict |
| broken | |
| buttermilk | |
| clay | |
| earthen | |
| large | ckópol,cixtpál hĕts,icpal he'ts ckopol,cictpál héts |
| round | |
| small | |
| soup | cko'pol, ckopo'l |

| ENGLISH | ATAKAPA |
|---|---|
| wash | |
| wooden | |
| small | |
| Box | teyó |
| Bucket | cixt, cict, cit, nec |
| water | |
| Caldron | |
| Can | |
| tin | |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | |
| Container | |
| Crockery | |
| shelf | |
| Cup | ăm, ckōp, kapō', ka |
| drinking | ăm, ă'mcne ckóp, kapó ă'menēn |
| earthenware | |
| Indian made | yuk'hi'tika ǎ'mcne |
| measuring | |
| pottery | luitka ǎ'mce, amcne |
| small | |

| ENGLISH | ATAKAPA |
|---|---|
| spouted | |
| tea | |
| tin | |
| Decanter | |
| Dipper | ăm, ckōp |
| Dish | icpál, cixtpal máñ<br>pāl, cixt, cict, cit, hicpál, cixtpal, icpalmañ |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | yuk'hi'ti ka hicpa'l |
| large | |
| lid | |
| pottery | |
| shallow | |
| wooden | |
| Earthenware | |
| Erysipelas | |
| Flagon | |
| Flask | |
| Glass | |
| drinking | |
| wine | |
| Goblet | cixt, cict, cit, cixt-kópaxe |
| Gourd | |

| ENGLISH | ATAKAPA |
|---|---|
| Griddle | |
| Hogshead | |
| Jar | cixt, pāl, cit, cict |
| sofkee | |
| grease | ē$\bar{\text{n}}$ ká-une cixt |
| Jug | |
| earthen | |
| stone | wai cixt |
| water | |
| Keg | |
| small | |
| Kettle | cixt, cict, cit |
| brass | |
| iron | kudsnă'n cíxt |
| tea | |
| tin | |
| Ladle | |
| Laver | |
| Luggage | |
| Mug | |
| small | |
| Pail | cixt, nec, nec cixt, cit, cict |
| tin | |
| water | |
| Pan | |

| ENGLISH | ATAKAPA |
|---|---|
| coffee parching | kapi' itsa'-ine |
| dish | |
| fire | |
| frying | itsai |
| milk | |
| sauce | |
| tin | |
| Phial | |
| Piggin | |
| water | |
| Pipe | |
| Pitcher | cixt, cict, cit  cict kaukaú |
| Plate | ka, cixt, cict, cit, pāl, cíxtpal, hicpál, icpál |
| earthenware | |
| large | |
| soup | |
| tin or pewter | |
| Platter | |
| Pot | cixt, cict, cit, pāl, cixt pal, hicpál, cikpál, icpál |
| chamber | |
| clay | |
| coffee | |
| tin | |
| cooking | |
| earthen | |

| ENGLISH | ATAKAPA |
| --- | --- |
| small | |
| iron | |
| large | |
| lid | cix́t pā́c |
| small | |
| stone | |
| tea | |
| water | |
| Pottery | lu |
| Puncheon | |
| Saucer | |
| Scoop | |
| Spoon | |
| large | |
| wooden | |
| Buffalo horn | |
| Strainer | |
| Stove | |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | kaúkau ná-utne |
| wash | |
| Tumbler | cixt, cict, cit, cixt-kópaxe |
| glass | |

| ENGLISH | ATAKAPA |
|---|---|
| Tun | |
| Tureen | |
| Tray | |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | BILOXI |
|---|---|
| Barrel | |
| Basket | a$^{n}$taska |
| Basin | |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | konicka', konixka' |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | |
| square | |
| Bowl | kdopka', mûsuda, mŭsŭ́dạ, mŭsûda |
| broken | |
| buttermilk | |
| clay | |
| earthen | mŭsŭdạ', kdopká |
| large | |
| round | |
| small | |
| soup | |

| ENGLISH | BILOXI |
|---|---|
| wash | |
| wooden | |
| small | |
| Box | xap |
| Bucket | tŭpi', tŭwi' |
| water | |
| Caldron | |
| Can | |
| tin | |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | |
| Container | |
| Crockery | |
| shelf | |
| Cup | i$^{n}$, mûsuda |
| drinking | |
| earthenware | mûsŭdi', yiñḳi |
| Indian made | |
| measuring | |
| pottery | |
| small | |

| ENGLISH | BILOXI |
|---|---|
| spouted | |
| tea | |
| tin | niho$^{n\prime}$ yiñki' |
| Decanter | |
| Dipper | |
| Dish | kdopká, mûsuda, mŭsŭdạ́, mŭsûda |
| big | |
| deep | kdopka |
| earthenware | mŭsŭdạ́ soitká |
| flat | |
| Indian made | |
| large | |
| lid | |
| pottery | hamá mûsûdá |
| shallow | |
| wooden | áya$^{n}$ mûsûdá |
| Earthenware | |
| Erysipelas | |
| Flagon | |
| Flask | |
| Glass | |
| drinking | |
| wine | |
| Goblet | |
| Gourd | |

| ENGLISH | BILOXI |
| --- | --- |
| Griddle | |
| Hogshead | |
| Jar | |
| sofkee | |
| grease | |
| Jug | konicka, so$^{n}$, konixka. so$^{n}$ho$^{n}$ní |
| earthen | |
| stone | |
| water | |
| Keg | |
| small | |
| Kettle | so$^{n}$, so$^{n}$ho$^{n}$ní |
| brass | amasi sidi so$^{n}$ho$^{n}$ní |
| iron | amasi so$^{n}$ho$^{n}$ni |
| tea | |
| tin | |
| Ladle | |
| Laver | |
| Luggage | |
| Mug | |
| small | |
| Pail | tŭpi |
| tin | |
| water | |
| Pan | |

| ENGLISH | BILOXI |
|---|---|
| coffee parching | |
| dish | |
| fire | |
| frying | |
| milk | |
| sauce | |
| tin | yĕskasa$^{n}$, ĭskŭ́m mŭsŭdą́ |
| Phial | |
| Piggin | |
| water | |
| Pipe | |
| Pitcher | mûsuda, mŭsadá ho$^{n}$ní |
| Plate | mûsuda |
| earthenware | mŭsŭ́t xapká |
| large | |
| soup | kdopká |
| tin or pewter | yĕskasa$^{n}$, ĭsksŭ́m mŭsŭdá xápka |
| Platter | |
| Pot | xo$^{n}$, so$^{n}$ho$^{n}$ní |
| chamber | |
| clay | |
| coffee | |
| tin | |
| cooking | |
| earthen | |

| ENGLISH | BILOXI |
|---|---|
| small | |
| iron | |
| large | |
| lid | |
| small | |
| stone | |
| tea | |
| water | |
| Pottery | |
| Puncheon | |
| Saucer | |
| Scoop | |
| Spoon | |
| large | |
| wooden | |
| Buffalo horn | |
| Strainer | |
| Stove | |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | tŭpí nitaní |
| wash | |
| Tumbler | anipá hio$^{n}$ní, ani |
| glass | |

| ENGLISH | BILOXI |
|---|---|
| Tun | |
| Tureen | |
| Tray | |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | CHEROKEE |
|---|---|
| Barrel | |
| Basket | thalutsa |
| Basin | |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | ku.ku. |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | |
| square | |
| Bowl | unvwe.ta |
| broken | |
| buttermilk | |
| clay | |
| earthen | |
| large | |
| round | |
| small | |
| soup | |

| ENGLISH | CHEROKEE |
|---|---|
| wash | |
| wooden | |
| small | |
| Box | khane.sa |
| Bucket | thalu.ki.ski |
| water | |
| Caldron | |
| Can | |
| tin | thalu.ki.ski |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | kaneso.lvsto.?ti |
| Container | kahlv.tohti, atsi/hstohti, kahlatihstohti,kahlthanv.tohti |
| Crockery | |
| shelf | |
| Cup | u.li·skwiti, ka.nuhuhlti |
| drinking | |
| earthenware | |
| Indian made | |
| measuring | |
| pottery | |
| small | |

| ENGLISH | CHEROKEE |
|---|---|
| spouted | |
| tea | |
| tin | |
| Decanter | |
| Dipper | |
| Dish | uhnawa |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | |
| large | |
| lid | |
| pottery | |
| shallow | |
| wooden | |
| Earthenware | |
| Erysipelas | |
| Flagon | |
| Flask | |
| Glass | |
| drinking | |
| wine | |
| Goblet | |
| Gourd | kalv.?na |

| ENGLISH | CHEROKEE |
|---|---|
| Griddle | |
| Hogshead | |
| Jar | |
| sofkee | |
| grease | |
| Jug | kataku.ka |
| earthen | |
| stone | |
| water | |
| Keg | |
| small | |
| Kettle | uthalo.ki |
| brass | |
| iron | |
| tea | |
| tin | |
| Ladle | |
| Laver | |
| Luggage | |
| Mug | |
| small | |
| Pail | |
| tin | |
| water | |
| Pan | |

| ENGLISH | CHEROKEE |
|---|---|
| coffee parching | |
| dish | |
| fire | |
| frying | |
| milk | |
| sauce | |
| tin | |
| Phial | |
| Piggin | |
| water | |
| Pipe | v.nthi |
| Pitcher | |
| Plate | ahte.li.to, kanuhihlti |
| earthenware | |
| large | |
| soup | |
| tin or pewter | |
| Platter | |
| Pot | |
| chamber | |
| clay | |
| coffee | |
| tin | |
| cooking | |
| earthen | |

| ENGLISH | CHEROKEE |
|---|---|
| small | |
| iron | |
| large | tsu.la?ski |
| lid | |
| small | |
| stone | |
| tea | |
| water | |
| Pottery | v.nthi |
| Puncheon | |
| Saucer | ahto?c.lvhstohti |
| Scoop | |
| Spoon | |
| large | |
| wooden | |
| Buffalo horn | |
| Strainer | kaneso.lv sto.?ti |
| Stove | |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | |
| wash | |
| Tumbler | |
| glass | |

| ENGLISH | CHEROKEE |
| --- | --- |
| Tun | |
| Tureen | |
| Tray | |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | ku.ku. |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | CHICKASAW |
| --- | --- |
| Barrel | iti kolofa ishto |
| Basket | kishi |
| Basin | |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | kitoba |
| flat | kitoba latussa |
| glass | |
| blue-green | |
| clear | |
| leather | kitoba shukcha |
| round | |
| square | |
| Bowl | umposhi hofobi |
| broken | |
| buttermilk | |
| clay | |
| earthen | |
| large | |
| round | |
| small | umposhi hofobi iskuno |
| soup | |

| ENGLISH | CHICKASAW |
|---|---|
| wash | |
| wooden | |
| small | |
| Box | nan aiulhto |
| Bucket | oka isht ochi |
| water | |
| Caldron | iyasha ishto |
| Can | |
| tin | |
| Canteen | |
| Cask | iti kolofa ishto |
| Chalice | |
| Charger | |
| Cistern | oka aiyuka |
| Collander | |
| Container | |
| Crockery | chuti |
| shelf | |
| Cup | isht aiishko |
| drinking | |
| earthenware | |
| Indian made | |
| measuring | |
| pottery | |
| small | |

| ENGLISH | CHICKASAW |
|---|---|
| spouted | |
| tea | |
| tin | |
| Decanter | |
| Dipper | isht takafa |
| Dish | umposhi |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | |
| large | |
| lid | |
| pottery | |
| shallow | umposhi palussa |
| wooden | |
| Earthenware | chuti |
| Erysipelas | |
| Flagon | |
| Flask | kitoba latussa |
| Glass | |
| drinking | |
| wine | |
| Goblet | |
| Gourd | lokush |

| ENGLISH | CHICKASAW |
| --- | --- |
| Griddle | |
| Hogshead | |
| Jar | kitoba |
| sofkee | |
| grease | |
| Jug | lokfi kitoba |
| earthen | |
| stone | |
| water | |
| Keg | iti kolofoshi |
| small | |
| Kettle | iyasha |
| brass | sonuk lakna |
| iron | |
| tea | |
| tin | |
| Ladle | isht takufa |
| Laver | |
| Luggage | shapo |
| Mug | aiishko |
| small | |
| Pail | isht holhchi |
| tin | |
| water | |
| Pan | palussa |

| ENGLISH | CHICKASAW |
|---|---|
| coffee parching | |
| dish | |
| fire | |
| frying | |
| milk | |
| sauce | |
| tin | sonuk palussa |
| Phial | |
| Piggin | |
| water | |
| Pipe | |
| Pitcher | oka aiulhto |
| Plate | umposhi putha |
| earthenware | |
| large | |
| soup | |
| tin or pewter | |
| Platter | nipi aiulhto |
| Pot | iyasha |
| chamber | |
| clay | |
| coffee | |
| tin | |
| cooking | |
| earthen | |

| ENGLISH | CHICKASAW |
|---|---|
| small | |
| iron | |
| large | iyasha ishto |
| lid | |
| small | |
| stone | |
| tea | |
| water | |
| Pottery | |
| Puncheon | |
| Saucer | |
| Scoop | takuffi |
| Spoon | falush |
| large | |
| wooden | |
| Buffalo horn | |
| Strainer | |
| Stove | tulli ahalhti |
| Tank | oka ayuka |
| Tankard | oka isht ishko ishto |
| Tierce | |
| Tub | nan aiulhchifa |
| wash | |
| Tumbler | |
| glass | |

| ENGLISH | CHICKASAW |
|---|---|
| Tun | |
| Tureen | |
| Tray | nan aiulhto |
| Trencher | |
| Trough | aiimpa |
| Urn | nan aiulhto |
| Vase | pakali yuk̇li |
| Vat | aholhponi |
| Vessel | nan aiulhto |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | ketoboshi |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | CHOCTAW |
|---|---|
| Barrel | italfoa chito |
| Basket | kishi |
| Basin | isht ishko patassa |
| child's | ạlla aiimpa |
| wash | aiokami |
| Beaker | |
| Boiler | awaƚalli, aƚabocha, shuti |
| small | awaƚalli iskitini |
| Bottle | kotoba, kotoba alota achafa |
| flat | kotoba patạssa |
| glass | kotoba shohkalaƚi |
| blue-green | kotoba okchimali |
| clear | kotoba shohkalaƚi |
| leather | shukcha |
| round | |
| square | |
| Bowl | ampo |
| broken | ampkoa |
| buttermilk | |
| clay | |
| earthen | |
| large | ampo chito |
| round | |
| small | ampushi |
| soup | |

| ENGLISH | CHOCTAW |
|---|---|
| wash | aiokami, ampoaiachefa, ampoaiokami |
| wooden | itampo |
| small | itampushi |
| Box | kotoba |
| Bucket | isht ochi |
| water | oka isht ochi |
| Caldron | shuti chito |
| Can | isht ochi, oka isht ochi |
| tin | |
| Canteen | kotoba bolukta, koto bushi bolukta |
| Cask | italhfoa chito |
| Chalice | isht ishko |
| Charger | amphạta chito |
| Cistern | oka aiạlhto |
| Collander | |
| Container | |
| Crockery | ampo, amphata |
| shelf | ampo atạla |
| Cup | chakli, isht ishko |
| drinking | |
| earthenware | |
| Indian made | |
| measuring | |
| pottery | |
| small | isht ishkushi |

| ENGLISH | CHOCTAW |
|---|---|
| spouted | isht ishko chupak |
| tea | ti isht ishko, isht ishkushi |
| tin | |
| Decanter | kotoba shonkalaƛi |
| Dipper | lokush, isht takafa |
| Dish | aiimpa, ampmalaka, ampmạlha, aƛakafa |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | |
| large | ampo chito |
| lid | |
| pottery | |
| shallow | |
| wooden | |
| Earthenware | ampo |
| Erysipelas | shuti boluktabi |
| Flagon | isht ochi |
| Flask | kotoba potạssa |
| Glass | |
| drinking | |
| wine | |
| Goblet | |
| Gourd | lokush, isht kạfa |

| ENGLISH | CHOCTAW |
|---|---|
| Griddle | ampmahaia, ampmahaia, apalạska |
| Hogshead | itạlfoa chito |
| Jar | akolạs, lukfi kotoba |
| sofkee | |
| grease | |
| Jug | yaklạsh, yakolush, akuhish, lukfi kotoba |
| earthen | yakolush, yaklạsh |
| stone | |
| water | |
| Keg | it alh foushi |
| small | italh foushi |
| Kettle | shuti, shuti a$^{n}$sha, shuti mahaia, asonak, mahaia |
| brass | asonak, asonak lakna |
| iron | shuti iyasha |
| tea | |
| tin | asonak hata |
| Ladle | takli, lokush, isht kạfa, isht takli |
| Laver | aiokami, aiyupi |
| Luggage | shapo |
| Mug | isht ishko, isht ishko chaha |
| small | isht ishkushi |
| Pail | isht ochi, itampo |
| tin | asonak |
| water | isht ochi |
| Pan | amphata, ampo, ampo mahaia |

| ENGLISH | CHOCTAW |
|---|---|
| coffee parching | |
| dish | |
| fire | |
| frying | aiạlwạsha, apạla |
| milk | |
| sauce | awaɬalli, awaɬalli iskitini, haiyu$^{n}$kpolo awaɬalli |
| tin | |
| Phial | kotobushi |
| Piggin | oka isht ochi, isht ochi, oka a$^{n}$lhto |
| water | oka aiạlhto |
| Pipe | itạlfoa chito |
| Pitcher | oka aiạlhto, isht ishko chaha |
| Plate | aiimpa, amphạta, ampmalaspoa, ampmalaswa |
| earthenware | |
| large | amppa tạssa |
| soup | |
| tin or pewter | |
| Platter | amphạta chito, ampmalaspoa |
| Pot | shuti, shuti iyasha, aɬabocha |
| chamber | |
| clay | |
| coffee | chakli |
| tin | |
| cooking | chakli |
| earthen | shuti |

| ENGLISH | CHOCTAW |
|---|---|
| small | shutushi |
| iron | |
| large | iyasha chito, iyasha |
| lid | iyasha o$^{n}$ƛipa, shuti asha o$^{n}$ƛipa, shuti iyashao$^{n}$ƛipa |
| small | iyashushi, shutushi |
| stone | tạli, shuti |
| tea | ti ahoni |
| water | shuti oka aialhto, isht ochi, oka isht ochi, okatoba |
| Pottery | ampo, amphạta |
| Puncheon | itạlfoa chito |
| Saucer | |
| Scoop | takli, isht takli |
| Spoon | fulush isht impa |
| large | |
| wooden | |
| Buffalo horn | |
| Strainer | |
| Stove | |
| Tank | |
| Tankard | isht ishko |
| Tierce | itạlfoa chito |
| Tub | oka aiạlhto |
| wash | aiachefa |
| Tumbler | |
| glass | kobli |

| ENGLISH | CHOCTAW |
|---|---|
| Tun | itạlfoa chito |
| Tureen | |
| Tray | itampo |
| Trencher | itampo, itikula aiimpa |
| Trough | oka aiạlhto |
| Urn | |
| Vase | |
| Vat | oka aiạlhto |
| Vessel | aiạlbiha, aiạlhto, ampo |
| brass | asonak |
| clay | |
| drinking | aiishko |
| food boiling | ałabocha |
| meat cooking | nipi ahoni |
| not for water | |
| small earthen | shutushi |
| tin | asonak |
| water | oka ạlhto |
| Vessels | |
| Vial | koto bushi |
| Winefat | ai albiha |
| | |
| | |
| | |
| | |

| ENGLISH | MOBILIAN |
|---|---|
| Barrel | |
| Basket | *tapak keše |
| Basin | |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | *kotoba |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | |
| square | |
| Bowl | *ayąpo |
| broken | |
| buttermilk | |
| clay | |
| earthen | |
| large | |
| round | |
| small | |
| soup | |

| ENGLISH | MOBILIAN |
|---|---|
| wash | |
| wooden | |
| small | |
| Box | |
| Bucket | |
| water | |
| Caldron | |
| Can | |
| tin | |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | |
| Container | |
| Crockery | |
| shelf | |
| Cup | *ayą̧po (ayą̧po) hahemepa |
| drinking | |
| earthenware | |
| Indian made | |
| measuring | |
| pottery | |
| small | |

| ENGLISH | MOBILIAN |
|---|---|
| spouted | |
| tea | |
| tin | |
| Decanter | |
| Dipper | |
| Dish | |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | |
| large | |
| lid | |
| pottery | |
| shallow | |
| wooden | |
| Earthenware | |
| Erysipelas | |
| Flagon | |
| Flask | |
| Glass | |
| drinking | |
| wine | |
| Goblet | |
| Gourd | *šešekoše |

| ENGLISH | MOBILIAN |
|---|---|
| Griddle | |
| Hogshead | |
| Jar | |
| sofkee | |
| grease | |
| Jug | |
| earthen | |
| stone | |
| water | |
| Keg | |
| small | |
| Kettle | |
| brass | |
| iron | |
| tea | |
| tin | |
| Ladle | |
| Laver | |
| Luggage | |
| Mug | |
| small | |
| Pail | |
| tin | |
| water | |
| Pan | |

| ENGLISH | MOBILIAN |
|---|---|
| coffee parching | |
| dish | |
| fire | |
| frying | |
| milk | |
| sauce | |
| tin | |
| Phial | |
| Piggin | |
| water | |
| Pipe | |
| Pitcher | |
| Plate | |
| earthenware | |
| large | |
| soup | |
| tin or pewter | |
| Platter | |
| Pot | *šote |
| chamber | |
| clay | |
| coffee | |
| tin | |
| cooking | |
| earthen | |

| ENGLISH | MOBILIAN |
| --- | --- |
| small | |
| iron | |
| large | |
| lid | |
| small | |
| stone | |
| tea | |
| water | |
| Pottery | |
| Puncheon | |
| Saucer | |
| Scoop | |
| Spoon | *ešt empa |
| large | |
| wooden | |
| Buffalo horn | |
| Strainer | |
| Stove | |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | |
| wash | |
| Tumbler | |
| glass | |

| ENGLISH | MOBILIAN |
|---|---|
| Tun | |
| Tureen | |
| Tray | |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | MUSKOGEE |
|---|---|
| Barrel | towvnv́ke |
| Basket | sakkv, sámpa, sákka |
| Basin | palvknv-sokoskv |
| child's | |
| wash | este-turofv-palvkne-okoskv |
| Beaker | |
| Boiler | |
| small | |
| Bottle | fvlásko, tepokv, falá·sko |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | |
| square | |
| Bowl | sésketv-rákko, palv́knakúcē, palaknasó·fka |
| broken | |
| buttermilk | |
| clay | |
| earthen | |
| large | |
| round | palakna/paló·ki |
| small | |
| soup | |

| ENGLISH | MUSKOGEE |
|---|---|
| wash | |
| wooden | |
| small | |
| Box | |
| Bucket | uē-escaúkv, há·lo |
| water | |
| Caldron | |
| Can | acv́nkv |
| tin | |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | |
| Container | es-éssétv |
| Crockery | |
| shelf | 'sisk-itá |
| Cup | sésketúcē, sesketv, hálo |
| drinking | há·lo |
| earthenware | |
| Indian made | |
| measuring | |
| pottery | |
| small | |

| ENGLISH | MUSKOGEE |
|---|---|
| spouted | |
| tea | séskettúcē |
| tin | há·lo |
| Decanter | |
| Dipper | svkcaúkv, escáukv |
| Dish | pvlv́knv-súfkat, palaknapaló·ki |
| big | palaknał́a·kko |
| deep | |
| earthenware | |
| flat | palaknatapíksi |
| Indian made | |
| large | |
| lid | |
| pottery | |
| shallow | |
| wooden | |
| Earthenware | arkv́swv |
| Erysipelas | |
| Flagon | |
| Flask | fvlásko |
| Glass | |
| drinking | |
| wine | uehómē-cátē-sesketv |
| Goblet | séskē-rákko |
| Gourd | efépē, fépe, fípí. |

| ENGLISH | MUSKOGEE |
|---|---|
| Griddle | |
| Hogshead | |
| Jar | mutésv, falá·sko |
| sofkee | aɬkáswa |
| grease | |
| Jug | mutésv, lucúwv |
| earthen | |
| stone | |
| water | |
| Keg | towvnv́ kucē |
| small | |
| Kettle | vrkv́swv, (i)lihá·ya |
| brass | ca·ɬkaslá·ni, carkvslánē, etē-hvrkv́swv, ca·ɬkaswa, icha.skaɬwa |
| iron | |
| tea | uéwv-esmoréckv |
| tin | |
| Ladle | svkcaúkv, re-esrékkíckv |
| Laver | |
| Luggage | |
| Mug | sésketv |
| small | |
| Pail | ue-escaúkv, vcv́nkv |
| tin | |
| water | ue-es-ev́nkv |
| Pan | pvlv́knv |

| ENGLISH | MUSKOGEE |
|---|---|
| coffee parching | |
| dish | |
| fire | totkv-palv́knv |
| frying | ésmoréckucē, sv́kmoréckv, ésmoréckv |
| milk | wakv-péssē-palv́knv |
| sauce | |
| tin | hálo-palv́knv |
| Phial | |
| Piggin | |
| water | |
| Pipe | hicipákwa |
| Pitcher | vewv-svcv́nkv, pēcṿ́ |
| Plate | palv́knv, palákna |
| earthenware | |
| large | |
| soup | |
| tin or pewter | palv́knv-hv́tkē |
| Platter | palv́knv-tvpéksē, leháyv-tvpéksē, palaknacá·pko |
| Pot | leháyv-tvpéksē, ellē-oca, (i)lihá·ya,<br>ałkaswa |
| chamber | natv́rkv |
| clay | ałkas, ałkáswa |
| coffee | |
| tin | |
| cooking | |
| earthen | natv́rkv, vrkv́swv |

| ENGLISH | MUSKOGEE |
|---|---|
| small | |
| iron | ʔlihá·ya |
| large | |
| lid | lehа́yv-tvpéksē-orv́nkv |
| small | |
| stone | |
| tea | v́ssē-vcv́nkv |
| water | |
| Pottery | |
| Puncheon | |
| Saucer | |
| Scoop | |
| Spoon | hákka |
| large | hakkaʔá·kko |
| wooden | |
| Buffalo horn | yapihákka |
| Strainer | |
| Stove | catoháyya |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | |
| wash | |
| Tumbler | seśketv |
| glass | |

| ENGLISH | MUSKOGEE |
|---|---|
| Tun | |
| Tureen | |
| Tray | vcvlvpétv-vtēh́kv |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | es-éssétv |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | sákkv, vtéhkv |
| small earthen | |
| tin | |
| water | vevn'kv |
| Vessels | eséssétv |
| Vial | fvláskucē |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | OFO |
|---|---|
| Barrel | |
| Basket | atuphô$^{\acute{n}}$tuska |
| Basin | |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | táblokĭ |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | |
| square | |
| Bowl | |
| broken | |
| buttermilk | |
| clay | |
| earthen | |
| large | |
| round | |
| small | |
| soup | |

| ENGLISH | OFO |
|---|---|
| wash | |
| wooden | |
| small | |
| Box | taki'ska |
| Bucket | tcotkukû'so |
| water | |
| Caldron | |
| Can | |
| tin | |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | |
| Container | |
| Crockery | |
| shelf | |
| Cup | anǐsho'pi |
| drinking | |
| earthenware | |
| Indian made | |
| measuring | |
| pottery | |
| small | |

| ENGLISH | OFO |
| --- | --- |
| spouted | |
| tea | |
| tin | |
| Decanter | |
| Dipper | |
| Dish | |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | |
| large | |
| lid | |
| pottery | |
| shallow | |
| wooden | |
| Earthenware | |
| Erysipelas | |
| Flagon | |
| Flask | |
| Glass | |
| drinking | |
| wine | |
| Goblet | |
| Gourd | |

| ENGLISH | OFO |
| --- | --- |
| Griddle | |
| Hogshead | |
| Jar | |
| sofkee | |
| grease | |
| Jug | |
| earthen | |
| stone | |
| water | |
| Keg | |
| small | |
| Kettle | |
| brass | |
| iron | |
| tea | |
| tin | |
| Ladle | |
| Laver | |
| Luggage | |
| Mug | |
| small | |
| Pail | |
| tin | |
| water | |
| Pan | |

| ENGLISH | OFO |
|---|---|
| coffee parching | |
| dish | |
| fire | |
| frying | |
| milk | |
| sauce | |
| tin | |
| Phial | |
| Piggin | |
| water | |
| Pipe | |
| Pitcher | |
| Plate | ta'cka |
| earthenware | |
| large | |
| soup | |
| tin or pewter | |
| Platter | |
| Pot | amô$^{n}$´fi |
| chamber | |
| clay | |
| coffee | |
| tin | |
| cooking | |
| earthen | |

| ENGLISH | OFO |
|---|---|
| small | |
| iron | |
| large | |
| lid | |
| small | |
| stone | |
| tea | |
| water | |
| Pottery | amô$^{ń}$fi |
| Puncheon | |
| Saucer | |
| Scoop | |
| Spoon | |
| large | |
| wooden | |
| Buffalo horn | |
| Strainer | |
| Stove | |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | |
| wash | |
| Tumbler | |
| glass | |

| ENGLISH | OFO |
|---|---|
| Tun | |
| Tureen | |
| Tray | |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | SEMINOLE |
|---|---|
| Barrel | |
| Basket | |
| Basin | |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | |
| square | |
| Bowl | paláknа |
| broken | |
| buttermilk | |
| clay | |
| earthen | |
| large | |
| round | |
| small | |
| soup | |

| ENGLISH | SEMINOLE |
|---|---|
| wash | |
| wooden | |
| small | |
| Box | |
| Bucket | oyscáwka |
| water | |
| Caldron | |
| Can | |
| tin | |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | |
| Container | |
| Crockery | |
| shelf | |
| Cup | há·lo(ci) |
| drinking | |
| earthenware | |
| Indian made | |
| measuring | há·lo |
| pottery | |
| small | |

| ENGLISH | SEMINOLE |
| --- | --- |
| spouted | |
| tea | |
| tin | |
| Decanter | |
| Dipper | |
| Dish | palákna |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | |
| large | |
| lid | |
| pottery | |
| shallow | |
| wooden | |
| Earthenware | |
| Erysipelas | |
| Flagon | |
| Flask | |
| Glass | |
| drinking | hásakí·ƛka |
| wine | |
| Goblet | |
| Gourd | |

| ENGLISH | SEMINOLE |
|---|---|
| Griddle | |
| Hogshead | |
| Jar | há·lo, falá·sko(cí) |
| sofkee | |
| grease | |
| Jug | |
| earthen | |
| stone | |
| water | |
| Keg | |
| small | |
| Kettle | |
| brass | |
| iron | |
| tea | |
| tin | |
| Ladle | |
| Laver | |
| Luggage | |
| Mug | |
| small | |
| Pail | oyscáwka |
| tin | |
| water | |
| Pan | snołéycka |

| ENGLISH | SEMINOLE |
|---|---|
| coffee parching | |
| dish | |
| fire | |
| frying | sakmołéycka |
| milk | |
| sauce | |
| tin | |
| Phial | |
| Piggin | |
| water | |
| Pipe | |
| Pitcher | |
| Plate | palákna |
| earthenware | |
| large | |
| soup | |
| tin or pewter | |
| Platter | |
| Pot | ishómpitahá·ka, oyscáwka, snołéycka |
| chamber | |
| clay | |
| coffee | |
| tin | |
| cooking | |
| earthen | |

| ENGLISH | SEMINOLE |
| --- | --- |
| small | |
| iron | |
| large | |
| lid | |
| small | |
| stone | |
| tea | |
| water | |
| Pottery | |
| Puncheon | |
| Saucer | |
| Scoop | |
| Spoon | |
| large | |
| wooden | hákka |
| Buffalo horn | |
| Strainer | |
| Stove | snołéycka |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | |
| wash | |
| Tumbler | |
| glass | |

| ENGLISH | SEMINOLE |
|---|---|
| Tun | |
| Tureen | |
| Tray | |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | TUNICA |
|---|---|
| Barrel | rihkumɛ́ra |
| Basket | lɔ́hka |
| Basin | |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | póluhki |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | poluhtólu |
| square | póluhkálu |
| Bowl | kóhinamáhkini |
| broken | |
| buttermilk | |
| clay | |
| earthen | |
| large | |
| round | |
| small | |
| soup | |

| ENGLISH | TUNICA |
| --- | --- |
| wash | |
| wooden | |
| small | |
| Box | ríhkuwóhku, rihkuwohkutohku |
| Bucket | láskunkéni, laskunkent?e |
| water | |
| Caldron | |
| Can | |
| tin | |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | |
| Container | |
| Crockery | |
| shelf | |
| Cup | kóhina |
| drinking | |
| earthenware | |
| Indian made | |
| measuring | |
| pottery | |
| small | |

| ENGLISH | TUNICA |
|---|---|
| spouted | |
| tea | |
| tin | |
| Decanter | |
| Dipper | |
| Dish | kóhinʔɛ́sa |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | |
| large | |
| lid | kóhinʔɛ́sa tapohku |
| pottery | |
| shallow | |
| wooden | |
| Earthenware | |
| Erysipelas | |
| Flagon | |
| Flask | |
| Glass | kɔ́ramášˇa |
| drinking | |
| wine | |
| Goblet | |
| Gourd | šúhkali |

| ENGLISH | TUNICA |
|---|---|
| Griddle | |
| Hogshead | |
| Jar | |
| sofkee | |
| grease | |
| Jug | |
| earthen | |
| stone | |
| water | wíšitá?eri |
| Keg | |
| small | |
| Kettle | ?ɔ́škačéhkint?e,ʔɔ́škačéhkini |
| brass | |
| iron | |
| tea | |
| tin | |
| Ladle | |
| Laver | |
| Luggage | |
| Mug | |
| small | |
| Pail | láskunkéni |
| tin | |
| water | |
| Pan | |

| ENGLISH | TUNICA |
|---|---|
| coffee parching | |
| dish | |
| fire | |
| frying | |
| milk | |
| sauce | |
| tin | |
| Phial | |
| Piggin | |
| water | |
| Pipe | |
| Pitcher | wíšitá?eri |
| Plate | kohin?ɛ́sa |
| earthenware | |
| large | |
| soup | |
| tin or pewter | |
| Platter | |
| Pot | |
| chamber | |
| clay | |
| coffee | káfitámašu |
| tin | |
| cooking | |
| earthen | |

| ENGLISH | TUNICA |
|---|---|
| small | |
| iron | ?ɔ́škǎčéhkini |
| large | |
| lid | |
| small | ?ɔ́škačéhkintóhku |
| stone | |
| tea | |
| water | |
| Pottery | hálikohina |
| Puncheon | |
| Saucer | |
| Scoop | |
| Spoon | ?úšihki |
| large | |
| wooden | |
| Buffalo horn | |
| Strainer | |
| Stove | ?áyirí |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | |
| wash | |
| Tumbler | kɔ́ramáša, kɔ́ramášat?ɛ |
| glass | |

| ENGLISH | TUNICA |
|---|---|
| Tun | |
| Tureen | |
| Tray | |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | |
| brass | |
| clay | kóhina |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | |
| Winefat | |
| | |
| | |
| | |
| | |

| ENGLISH | YUCHI |
|---|---|
| Barrel | y'adida |
| Basket | dᴔsti |
| Basin | |
| child's | |
| wash | |
| Beaker | |
| Boiler | |
| small | |
| Bottle | dičʰᴔnę |
| flat | |
| glass | |
| blue-green | |
| clear | |
| leather | |
| round | |
| square | |
| Bowl | didanɛ̨ |
| broken | |
| buttermilk | t̯ošidat̯a |
| clay | s'ᴔšodidanɛ̨ |
| earthen | |
| large | |
| round | |
| small | |
| soup | |

| ENGLISH | YUCHI |
|---|---|
| wash | |
| wooden | yadąt̪anę |
| small | |
| Box | ƛ?ostanį |
| Bucket | č$^h$aka d$^z$ɛ gɛ?ʌ̨nį |
| water | |
| Caldron | |
| Can | |
| tin | |
| Canteen | |
| Cask | |
| Chalice | |
| Charger | |
| Cistern | |
| Collander | |
| Container | |
| Crockery | |
| shelf | |
| Cup | d$^z$ ep̓enę |
| drinking | |
| earthenware | |
| Indian made | |
| measuring | |
| pottery | |
| small | |

| ENGLISH | YUCHI |
|---|---|
| spouted | |
| tea | |
| tin | |
| Decanter | |
| Dipper | $d^{z}$ɛgɛyæ hæ nį |
| Dish | dǫt̯ǫnę |
| big | |
| deep | |
| earthenware | |
| flat | |
| Indian made | |
| large | |
| lid | |
| pottery | |
| shallow | |
| wooden | yadǫt̯anɛ̨ |
| Earthenware | |
| Erysipelas | |
| Flagon | |
| Flask | |
| Glass | $d^{z}$ep̓ęšaøa |
| drinking | $d^{z}$ɛ·b?ɛ̨ša |
| wine | |
| Goblet | |
| Gourd | $t^{h}$ǫp̓æ |

| ENGLISH | YUCHI |
| --- | --- |
| Griddle | |
| Hogshead | |
| Jar | |
| sofkee | |
| grease | |
| Jug | |
| earthen | |
| stone | |
| water | |
| Keg | |
| small | |
| Kettle | t̪adekʾʌ̢ |
| brass | |
| iron | |
| tea | |
| tin | |
| Ladle | |
| Laver | |
| Luggage | |
| Mug | |
| small | |
| Pail | |
| tin | |
| water | |
| Pan | |

| ENGLISH | YUCHI |
|---|---|
| coffee parching | |
| dish | ča$^{h}$kaḓa̜·ṯani̜ |
| fire | |
| frying | da̜~ṯ ek̀ o̜ hista |
| milk | |
| sauce | |
| tin | |
| Phial | |
| Piggin | |
| water | |
| Pipe | |
| Pitcher | |
| Plate | da·ṯanɛ̜ |
| earthenware | |
| large | |
| soup | |
| tin or pewter | |
| Platter | |
| Pot | ṯadek'ʌ̜ |
| chamber | |
| clay | |
| coffee | kaφi(we)kʌ̜nɛ̜ |
| tin | |
| cooking | |
| earthen | č$^{h}$akak'a(la)gego̜ne̜ |

| ENGLISH | YUCHI |
|---|---|
| small | |
| iron | |
| large | |
| lid | |
| small | |
| stone | |
| tea | |
| water | |
| Pottery | dičaƛa |
| Puncheon | |
| Saucer | |
| Scoop | |
| Spoon | štinę |
| large | y'a štinę |
| wooden | |
| Buffalo horn | |
| Strainer | |
| Stove | sįndibanį |
| Tank | |
| Tankard | |
| Tierce | |
| Tub | |
| wash | |
| Tumbler | d^z ɛ·b?ęša |
| glass | |

| ENGLISH | YUCHI |
|---|---|
| Tun | |
| Tureen | |
| Tray | k'ala t̺ age?onɛ̨ |
| Trencher | |
| Trough | |
| Urn | |
| Vase | |
| Vat | |
| Vessel | |
| brass | |
| clay | |
| drinking | |
| food boiling | |
| meat cooking | |
| not for water | |
| small earthen | |
| tin | |
| water | |
| Vessels | |
| Vial | |
| Winefat | |
| | |
| | |
| | |
| | |

Appendix K

See Faunal Analysis section of Chapter 13 for explanation of these two tables.

Animal Bone
Bell Phase Features

| | Feat 1 | Feat 2 | Feat 5 | Feat 12 | Feat 15 | Feat 18 | Feat 19 | Totals | % |
|---|---|---|---|---|---|---|---|---|---|
| Fish | 1 | | 7 | | | | | 8 | 1.8 |
| Mammal | 35 | 5 | 220 | 9 | 16 | 1 | 4 | 290 | 66.5 |
| Turtle | 37 | 4 | 74 | 2 | 4 | | | 121 | 27.8 |
| Bird | | 1 | 6 | | | | | 7 | 1.6 |
| Frog | | | 6 | | | | | 6 | 1.4 |
| Snake | | | 2 | | | | | 2 | .5 |
| Salamander | | | 2 | | | | | 2 | .5 |
| Totals | 73 | 10 | 317 | 11 | 20 | 1 | 4 | 436 | 100.0 |

Animal Bone
FEATURE 13 (Duvall Phase)

| | Level 3 | Level 4 | Level 4A | Level 6 | Level 7 | Misc. | Totals | % |
|---|---|---|---|---|---|---|---|---|
| Fish | 4 | 4 | 1 | 3 | 0 | 5 | 17 | 8.6 |
| Mammal | 2 | 41 | 10 | 21 | 11 | 20 | 105 | 53.3 |
| Turtle | 0 | 10 | 3 | 18 | 3 | 10 | 44 | 22.3 |
| Snake | 1 | 11 | 4 | 1 | 0 | 6 | 23 | 11.7 |
| Bird | 3 | 0 | 0 | 2 | 0 | 3 | 8 | 4.1 |
| Totals | 10 | 66 | 18 | 45 | 14 | 44 | 97 | 100.0 |