12-2000

An Examination of Upland South Farmsteads Using an Evolutionary Ecology Methodology

Todd Michael Ahlman
University of Tennessee, Knoxville

To the Graduate Council:

I am submitting herewith a dissertation written by Todd Michael Ahlman entitled "An Examination of Upland South Farmsteads Using an Evolutionary Ecology Methodology." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Anthropology.

Charles H. Faulkner, Major Professor

We have read this dissertation and recommend its acceptance:

John B. Rehder, Gerald F. Schroedl

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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

To the Graduate Council:

I am submitting herewith a dissertation written by Todd Michael Ahlman entitled "An Examination of Upland South Farmsteads Using an Evolutionary Ecology Methodology." I have examined the final copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Anthropology.

Charles H. Faulkner, Major Professor

We have this dissertation
and recommend its acceptance:

Accepted for the Council:

Associate vice Chancellor and
Dean of The Graduate School

AN EXAMINATION OF UPLAND SOUTH FARMSTEADS USING AN EVOLUTIONARY ECOLOGY METHODOLOGY

A Dissertation
Presented for the
Doctor of Philosophy Degree
University of Tennessee, Knoxville
Department of Anthropology

Todd Michael Ahlman
December 2000

DEDICATION

This dissertation is dedicated to the men and women who worked long and hard on the farms of the Upland South. As this way of life is quickly disappearing, I hope that my efforts to document and preserve these lives will remind future generations of this lifestyle that is quickly fading.

ACKNOWLEDGMENTS

This dissertation is the accumulation of several years of research aimed at the study of rural life in the Upland South. I would not have made it this far without the help of my committee who prodded me along the way and provided invaluable insight and support. Most importantly, Dr. Charles Faulkner offered me insight and guidance during my entire graduate career. A long time ago when I was driving to Knoxville and the University of Tennessee I was not sure if I had made the right decision, but now I consider it one of my better choices in life and it is partially due to Dr. Faulkner and his support. As I have noted elsewhere, I consider Dr. Faulkner as a colleague, mentor, and friend. My many discussions with Dr. Gerald Schroedl about archaeological theory have been very enjoyable and beneficial to my understanding of archeological thought. It was at his suggestion that pursued the evolutionary ecology perspective used in this dissertation. The conversations we had about life in general, especially while we were St. Kitts, have been the most enjoyable and I value Dr. Schroedl's friendship. Dr. Jan Simek, for some reason, has always supported me and for this I am very grateful. I think Jan has also tried his best to keep me in line when it came to my musings about evolutionary theory, and you can judge for yourself if he was successful or not. Dr. John Rehder's interest in rural life added greatly to this dissertation. I will always value his input and advice.

A majority of the data used in this dissertation were derived from fieldwork that was funded by the Tennessee Valley Authority (TVA). The archaeologists of the TVA cultural resources program are committed to the preservation and study of cultural resources in the Tennessee Valley and without this interest the research in this dissertation could not have been accomplished. I wish to thank Pat Ezzell, J. Bennett Graham, Eric Howard, Danny Olinger, and Richard Yarnell for their commitment to historic preservation, and the support they gave me during my short stint as a contract archaeologist in the Norris office.

Numerous people assisted in the archaeological fieldwork undertaken by the University of Tennessee that was used in this dissertation. To list them all would require a volume all on its own. To them all, I thank you for your hard work and good spirits, especially on the many cold days out on the Watts Bar Reservoir and at the Tipton/Dixon House site. I could not have asked for a better crew and set of friends. I also wish to thank Dr. Susan Frankenberg, who managed the fieldwork at the University of Tennessee. She allowed me the chance to direct the reservoir surveys and the archaeological investigations at the Tipton/Dixon House site, and to her I am very grateful.

I wish to thank Dr. Kay Simpson of the Louis Berger Group, Inc. She graciously has given me the time and support I need to get this dissertation completed. I am very grateful to her for this. I also want to thank my fellow employees at Louis Berger who have given me abundant encouragement to keep me going, and have harassed me enough to keep my feet on the ground.

My parents and family deserve a large amount of credit because they supported my ventures in graduate school. Their support has been important to me, especially being so far away from home. So Mom, Dad, Edward, Shannon, Pam, Brandi, Chentelle, Mackenzie, and Hailey, thank you for your love and support. I also wish to thank my

grandparents who always had an interest in what I was doing and offered their love and support.

Finally, my beautiful wife Ashley deserves the biggest THANK YOU of anyone. She put up with my long hours of fieldwork and writing for many years. During the final push of my dissertation writing, she picked up my slack and did the cooking, cleaning, laundry, and everything else. She also served as the sounding board for some of my wacky ideas and kept me in line when it came to some of my thoughts. Without Ashley's love and devotion I would probably still be working on this dissertation. I also cannot forget our crazy animals Shelby, Harper, Winnie, and Scout. They could always sense the wrong moment to demand attention. As she did during my thesis, Shelby would remind me of one of the most important things in life, when it was time to go to bed and get some sleep.

ABSTRACT

The study of historic farmsteads in the Upland South has generally taken a normative approach that compared archaeologically recorded farmsteads to an idealized Upland South farmstead. This approach tends to avoid the issue of variation that is inherent among farmsteads within the region. To address this variation, a Darwinian evolutionary theoretical perspective is proposed. Of the different evolutionary perspectives in archaeology today, including selectionism, evolutionary psychology, and evolutionary ecology, it is proposed that an evolutionary ecological theoretical perspective is the best for examining and explaining the variation among Upland South farmsteads.

In employing an evolutionary ecology theoretical perspective, a resource maximization/time minimization model was developed that characterized a set of four strategies available to the farm families that occupied the farmsteads in the Upland South. To test this model, data concerning the types of features and structures present at 129 Upland South farmsteads were collected. It was hoped that a wide range of variation would be present among these farmsteads, which would facilitate the classification of each farmstead into the different strategies of the model. In order to test this, a principal components analysis and cluster analysis were undertaken.

The principal components analysis was used to examine the range of variation within the farmsteads in the sample. It was determined that the range of variation within the farmsteads was small, which made it to derive groups via the cluster analysis . Using the SAS procedure FAST CLUS, a second cluster analysis was undertaken that assigned

the farmsteads into eight clusters, which is the number of strategies in the model. The clusters derived from this procedure did not represent the ultimate classification of each farmstead into the individual strategies. These clusters did, however, assist in the classification of the individual farmsteads into the individual strategies.

An assumption raised during the classification process was a continuity of the strategy undertaken by the occupants of an individual farmstead. To demonstrate this continuity, an in-depth examination of the Tipton/Dixon House site was conducted. This examination showed that the occupants of this farm had undertaken a resource maximization strategy from its initial occupation in 1819 until it was abandoned in 1969.

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

CHAPTER 1

INTRODUCTION

The study of historic farmsteads in archaeology has recently grown as a result of compliance archaeology, an increasing interest in rural sites, and a general growth in historical archaeology. In East Tennessee, the analysis of farmsteads often involves comparisons to the Upland South cultural tradition model in an effort to understand the past human behavior that created the archaeological record (Ahlman 1996, 1998, 1999, 2000a; Ahlman et al. 1999; Faulkner 1988, 1991; Longmire 1996; Owens 1996). Some analyses take a normative approach that tend to be site specific comparisons to the ideal Upland South farmstead model (Ahlman 1998; Ahlman et al. 1999; Faulkner 1988, 1991; Longmire 1996; Owens 1996). Few have taken an approach that compares and analyzes multiple farmsteads (Ahlman 1996, 1999) and examine the variation that characterizes these sites (Ahlman 1996; Ahlman et al. 1999; Longmire 1996; Owens 1996, 1998). In general, these analyses have done little to examine the geographical and temporal variability associated with farmsteads in the Upland South, and as a result, little progress has been made toward understanding this variation.

The Upland South cultural tradition was originally developed by cultural geographers (Kniffen 1965; Kniffen and Glassie 1966; Newton 1974) to describe the typical housing often observed in Southern Appalachia. Historic archaeologists embraced the concept in the 1980s, and since then it has been used to describe and understand farmsteads from East Tennessee (Ahlman 1996, 1998; Ahlman et al. 1999; Faulkner 1988;

Longmire 1996; Owens 1996, 1998), southern Illinois (Hill et al. 1987; McCorvie 1987; McCorvie et al. 1989), and north-central Texas (Jurney and Moir 1987; Moir and Jurney 1987). As a result of this research, an Upland South farmstead "type" model has been developed by archaeologists. This model, however, seems to have become a real entity to some practitioners rather than a theoretical concept, which it should represent.

Upland South farmsteads have been studied archaeologically for the last 20 years along several lines of inquiry. One has been the investigation of an early manifestation and evolution of a cultural tradition where researchers examine the architectural components and features (Longmire 1996; Owens 1996, 1998). Owens (1998), for example, showed that the Exchange Place, located in northeastern Tennessee, went through a period when there was nucleation of the outbuildings around the dwelling during the farm's formation, then slowly dispersed away from the dwelling through time. A second line of inquiry involves a normative, comparative approach where an individual farm is compared to the ideal model (McCorvie et al. 1989; Longmire 1996). Finally, there are the investigations of the early 20th century manifestation (Ahlman 1996, 1997). These studies have been beneficial for interpreting and understanding the structures and features commonly identified at these sites; however, they are not as beneficial to the understanding of the broad picture of behavioral variation among the families that occupied the thousands of Upland South farmsteads throughout the last two centuries.

Recently, O'Brien and Lyman (2000) have advocated the use of a Darwinian evolutionary paradigm in historical archaeology for the explanation of past behavior. The paradigm they champion maintains that artifacts and the behavior that produced them are part of the human phenotype; therefore, they are subject to the same evolutionary mechanisms that affect human genetic makeup. In particular, they identify natural selection and drift as the mechanisms effecting change in behaviors and artifacts. Because of the methodology's heavy reliance on selection, this paradigm is often called by its practitioners and others "selectionism."

The advocates of selectionism propose that it is the best paradigm for the explanation of past human behavior because it is based in Darwinian theory, takes a population approach, and has a materialist methodology (Lyman and O'Brien 1998; O'Brien and Lyman 1995, 2000). The primary argument for this methodology is that artifact change, and to some extent cultural change, is due to the evolutionary forces of selection and drift. Accordingly, human intent and innovation have little to do with artifact and cultural change because intent and innovation are proximate causes of change rather than the originators of change. The most promising aspect of this paradigm is the methodological approach for creating theoretical units for analytical purposes.

The selectionist paradigm has been criticized for methodological shortcomings that relate to what its advocates note as the best aspects of the paradigm for explaining the past (Boone and Smith 1998; Schiffer 1996; Spencer 1997). These criticisms center around the methodology's lack of human involvement in its explanations. Another group of evolutionary archaeologists have advocated the use of evolutionary ecology to explain past human behavior (Boone and Smith 1998; Maschner and Mithen 1996). Evolutionary ecology is derived from behavioral ecology, which also views behavior as part of the phenotype of an animal. The difference lies in the path of interpretation. Evolutionary ecologists propose that through natural selection humans have the evolved capacity for phenotypic plasticity, which allows for the ability to weigh the short-term costs and benefits of a behavior and the adjustment of their behavior to maximize their fitness accordingly. This paradigm acknowledges that human intent and innovation play a major role in artifact and cultural change. The proponents of evolutionary ecology also advocate an individual perspective in their analysis. A central tenet of this paradigm is that culture reflects the accumulation of individual behaviors; therefore, it may be more appropriate to study behavior at an individual level rather than at the population level.

For these reasons, an evolutionary ecology approach is employed here to examine and address behavioral variation among Upland South farmsteads. In order to do this, the differences in the selectionist and evolutionary ecology paradigms are reviewed in Chapter 2. In this chapter, the advantages of using an evolutionary ecology approach versus a selectionist approach are addressed. A background for the development of the Upland South cultural tradition model is presented in Chapter 3, which serves as the basis for the construction of a hypothetical strategy set based on the evolutionary ecology concepts of resource maximization and time minimization that reflect the range of strategies available to Upland South farm families. A background for the development of the Upland South cultural tradition model is presented in Chapter 3, which serves as the basis for the construction of a hypothetical strategy set based on the evolutionary ecology concepts of resource maximization and time minimization reflecting the range of strategies available to Upland South families. Because there is a wide range of strategies available to farm families, it is hypothesized here that there should be a wide range of variation among

Upland South farmsteads in the occurrence of features and structures that represent the behaviors associated with these strategies.

To test this hypothesis and the validity of the strategies, a sample of Upland South farmsteads is examined to statistically test the within group variation. This sample includes farmsteads from throughout the Upland South, but will focus primarily on East Tennessee. The within group variation will be tested by examining the occurrence rate and type of outbuildings and features commonly identified at Upland South farmsteads. Chapter 4 presents the variables in the analysis and the three statistical tests, principal components, cluster, and correspondence analysis, used to study them. Through these procedures, the variation within the farmstead sample will be identified and measured in Chapter 5. These procedures are intended to identify which strategies were employed at particular farmsteads. The derived groups from the cluster analysis are applied to the different strategies and the characteristics of each cluster discussed.

Several assumptions are made during the analysis of the farmstead sample. First, the differences among the farmsteads actually represent different strategies undertaken by the individual farm families that occupied the farms in the analysis. Second, geography plays a small role in the differences among Upland South farmsteads. To test this, farmsteads from the fringes of the Upland South (southern Illinois, northern Alabama, and the Piedmont of South Carolina) are included in the study. The final assumption is that there is little temporal variation in the strategy undertaken by farm families at a single farmstead through time. To address that presumption, several farmsteads with long occupation periods and a few farmsteads that were only occupied for a few decades are included in the analysis.

Chapter 6 is a more detailed analysis of a single East Tennessee farmstead in Loudon County to further address the first and last assumptions. The Tipton-Dixon House site (40LD179) is analyzed in depth to demonstrate how the landscape changed through time and how these changes affected the strategy undertaken by the farmstead's occupants. This farmstead is one of the best studied farmsteads in East Tennessee (Ahlman 1998, 1999; Ahlman et al. 1999), and the landscape changes and different occupants at the farmstead have been well documented (Ahlman 1999; Ahlman et al. 1999). Chapter 7 is a summary of the findings of this study and a discussion of these results as they relate to the stated hypothesis and goals.

CHAPTER 2

DARWINIAN EVOLUTIONARY METHODOLOGY IN AMERICAN ARCHAEOLOGY

The use of a Darwinian evolutionary perspective in American archaeology dates to the late 19th century (Dunnell 1980; O'Brien 1996); however, it was not until the late 1970s (see O'Brien 1996) that it was revived and a resurgence in its application to archaeology was evident. The history and development of a Darwinian evolutionary perspective during the late 20th century are provided in O'Brien (1996; see also Dunnell 1980; Teltser 1995) and will not be reiterated here. Darwinian evolutionary approaches in archaeology tend to fall along three lines: the evolutionary archaeologists that follow a cultural selectionist perspective theorized by Robert Dunnell; evolutionary ecologists; and evolutionary psychologists. Robert Dunnell is most commonly associated with the revival of Darwinian thought in Americanist archaeology under the rubric of selectionism. While there has been much rhetoric by the advocates of this perspective, there have been few practical applications. Evolutionary ecology has been more widely applied in cultural anthropology but is gaining acceptance in archaeology, especially in the study of hunter-gatherer societies (Bettinger 1991; Hawkes et al. 1999). Common in cultural anthropology, evolutionary psychology has been less prevalent in archaeology. Therefore, only the cultural selectionist and evolutionary ecologist approaches are discussed in this chapter.

The Selectionist Approach

The most vocal advocates of a Darwinian evolutionary perspective in archaeology, although known by several names, are most commonly referred to as "selectionists" (Boone and Smith 1998; Lyman and O'Brien 1998; O'Brien and Lyman 2000; Teltser 1995). Boone and Smith (1998), in a critique of the methodology, use the term evolutionary archaeology because of its dependence on the evolutionary concepts of selection and drift to understand artifact and cultural change. The selectionist moniker arose from the perspective's reliance on natural selection as the driving force behind artifact and cultural change.

The selectionists aim to understand the differential persistence of variation in order to explain past human behavior (Teltser 1995:4). This viewpoint is based on the idea that the material culture of past human behavior is part of the human phenotype and as such it is subject to the same processes, natural selection and drift, that affect genetic traits (Jones et al. 1995; Lyman and O'Brien 1998; Maschner and Mithen 1996; O'Brien and Lyman 2000; Teltser 1995). Selectionists note that biologists study objects such as nests, shells, beaver dams, and other "hard parts of phenotypes" (O'Brien and Lyman 2000:78) and archaeologists study the same in artifacts; therefore, it is not unrealistic to treat artifacts as an extension of the human phenotype. O'Brien and Lyman (2000:77) observe that "[e]volutionists study populations of things, and in archaeology the population, not surprisingly, comprises artifacts." Although it can be questioned whether artifacts represent a population in a biological sense or not, the selectionists treat them (artifacts) as phenotypic populations to identify and measure variation.

From the selectionist viewpoint, three things are needed to apply a genetic evolutionary perspective as proposed by Lewontin (1970, 1974) to archaeological material: variation, inheritance or a source of transmission, and differential fitness (Boone and Smith 1998; Dunnell 1980; Lyman and O'Brien 1998; O'Brien and Lyman 2000). These three things, according to O'Brien and Lyman (2000:77), translate into three steps to make a selectionist perspective work:

> (1) identifying and measuring variation–that is, dividing variation into discrete sets of empirical units, or groups, using ideational units, or classes; (2) tracking those units through time and across space to produce a historical narrative about lineages of particular variation; and (3) explaining the differential persistence of lineages in particular time-space contexts.

These three steps are important to understanding how the selectionists go about identifying and measuring variation, as well as attempting to explain variation and/or change.

Identifying and Measuring Variation

Artifacts, features, structures, and structural remains are the units that selectionists use to identify and measure variation (Dunnell 1978, 1980, 1986, 1989, 1995; Leonard and Jones 1987; Lyman and O'Brien 1998; O'Brien and Holland 1992; O'Brien and Lyman 2000). The detection of variation involves the creation or identification of ideational or theoretical units comprised of discrete sets (artifacts, features, structural remains) characterized by empirical units (quantitative or qualitative traits) (O'Brien and

Lyman 2000:78). Selectionists purport to have a materialist inclination that requires the creation of ideational units rather than the creation of "types" in the usual archaeological concept of type (Dunnell 1980). This separates the selectionist perspective from a processual archaeology perspective of cultural evolution because a materialist perspective is based on material objects and the processual perspective is based on a typological methodology that is commonly associated with essentialism (Dunnell 1980).

The materialist concept of ideational units is based on the premise that there are no real archtypical artifact, set of artifacts, feature or structural remain. Ideational units are in essence analytical units to be used in measuring frequency variation or change (Dunnell 1986; Lyman et al. 1997; O'Brien and Lyman 2000). To construct these ideational units, selectionists, mainly Dunnell (1971, 1995) and O'Brien and Lyman (2000), use paradigmatic classification. In this system, the archaeologist chooses artifact variables or dimensions that are predetermined to be relevant to the question at hand that results "in the sorting of specimens into internally homogeneous, externally heterogeneous piles" (O'Brien and Lyman 2000:82). These "analytical units" as O'Brien and Lyman (2000:83) term them (Dunnell [1971, 1986, 1995] calls them "theoretical units") are not real entities that can be held or possessed but reside in the thoughts of the analyst. What these units represent are real traits possessed by artifacts and are referred to as "empirical units" (Dunnell 1995; O'Brien and Lyman 2000:83).

The positive side of paradigmatic classification, as the selectionists see it, is that the procedure can be applied consistently (O'Brien and Lyman 2000). In addition, each dimension can be analyzed separately, in any different combination or with any other dimension. This in turn can be useful to determining the most analytically important dimension based on the relative frequency of the dimension. The methodology for the identification of variation generally falls into dividing classes into discrete sets as outlined above; however, the measure of variation, while listed as step one, generally falls into step two when variation is tracked through the creation of historical lineages.

Historical Lineages and Transmission

The transmission of heritable traits is a sticky subject with the selectionists. The second requirement for evolutionary change to occur is heritability or a form of transmission; however, O'Brien and Lyman (2000:77) note that the second step of a successful evolutionary examination is to track "those units through time and across space to produce a historical narrative about lineages of particular variation." The creation of a heritable lineage is important to measuring variation and tracking change in relative trait frequencies through time, but the creation of a lineage fails to address the mode of transmission from one generation to the next.

The selectionists believe that historical lineages can be constructed using a technique that dates to a time when culture history ruled the theoretical world of archaeology: seriation. Teltser (1995; see also Dunnell 1970; O'Brien and Lyman 2000) notes that frequency seriation, and to some extent occurrence seriation, has captured the attention of the selectionists for two reasons. The first is that the "method is based on explanatory concepts about the nature of formal similarity and phylogenetic relationships" (Teltser 1995:52). In addition, it shows that there are historical relationships between populations (or within populations) across time and space. Secondly, frequency seriation "produces a relative chronology in a way that treats time as a continuous dimension, and change is expressed in terms of change to variant frequencies through time" (Teltser 1995:52). O'Brien and Lyman (2000) note that frequency seriation and occurrence seriation have applicability to historical archaeology and used Deetz and Dethlefesen's (1965, 1971; Dethlefesen and Deetz 1966) work on changing headstone styles as an example.

Frequency and occurrence seriation works in an evolutionary sense by first defining theoretical units, which is important because these units are temporally distributed according to the empirical units that comprise them (O'Brien and Lyman 2000:92). The temporal distribution of these units is important because both occurrence and frequency seriation compare and measure the similarity of artifact assemblages based on the temporal distribution of traits. Occurrence and frequency seriation, however, treat the temporal distribution of these assemblages differently. Occurrence seriation "assumes that a historical [theoretical] unit will have a single, continuous distribution over time" (O'Brien and Lyman 2000:93). Frequency seriation also assumes that there will be a single, continuous distribution over time, but further assumes "that the relative frequencies of specimens within each [theoretical unit] will fluctuate unimodally over time" (O'Brien and Lyman 2000:93). This, in essence, is the "battleship curves" that are popular culture historical models of seriation.

There are three requirements for the occurrence and frequency seriation methodology to work (Dunnell 1970; O'Brien and Lyman 2000; Teltser 1995). First, is that the seriated assemblages are of similar duration, which places the focus on age rather than on duration. Secondly, the assemblages must come from the same geographical area. Thirdly, the assemblages must be of the same cultural tradition. Controlling the first two requirements, time and space, ensures that the third requirement will be met.

In reality, the seriation of artifact assemblages is how selectionists measure variation across time and space. By comparing and charting relative artifact or theoretical unit frequencies through time, the selectionists are, in fact, identifying variation and then measuring it by comparing relative frequencies. The creation of theoretical or ideational units is really a process of identifying units for the analysis. It is not until these units are quantified or compared is a measure of variability undertaken.

At this point, it seems that there is a problem with step one of the selectionist process because one cannot identify and measure variation until the ideational or theoretical units have been developed. Actually, during the first step ideational units are developed for the analysis of artifact assemblages. It is not quite clear how the process of "dividing variation" into these units accounts for and measures variation. The process for identifying and measuring variation is really more apparent and real in the method that is used to create historical lineages: frequency seriation.

To actually measure variation, discrete and distinct ideational units are mapped through time with overlapping ideational units shared by assemblages creating a cultural or historical lineage (Dunnell 1971; O'Brien and Lyman 2000; Teltser 1995). It is at this point that variation is measured and that lineages are identified as occurring in the archaeological record. Then, a narrative about that lineage can be produced that can explain the differential persistence of traits through time.

The creating of a "historical narrative about lineages of particular variation" (O'Brien and Lyman 2000:77) is really a story that accounts for the measured variation as identified in the frequency seriation model. O'Brien and Lyman (2000), Teltser (1995), and Dunnell (1970, 1986) assume that these historical lineages created from occurrence and frequency seriation models represent the differential persistence of traits via some form of heritable continuity and transmission. They do not mean genetic inheritance but rather the inter- and intra-generational transmission of styles. This implies some form of human interaction and behavior on the part of those who form the basis of the transmission system; however, the selectionists downplay the role of human behavior in the role of transmission and place the major role in the transmitted variation on the evolutionary genetic processes of selection and drift.

Transmission and Differential Persistence

Once variation is identified and measured and a narrative is produced about the constructed frequency or occurrence seriation models, the selectionists move on to the final step of their process: explaining the differential persistence of traits and/or lineages. This is where the selectionist viewpoint is at odds with some other paradigms in archaeology. Selectionists believe that those traits directly affecting a person's fitness are subject to the processes of natural selection while those traits that have no direct affect on a person's fitness are subject to stochastic processes like drift. The traits acted on by selection are typically called functional, and the traits that are acted on by drift are typically classified by archaeologists as stylistic.

Selection acts on functional traits because an aspect of the traits is said to be a positive affect on a person's fitness, and thereby this trait (or the object that possesses it) will be favored by selection (Jones et al. 1995:27). The probability for the spread and/or continuance of a trait is thereby dependent on the positive fitness induced by the trait. How to measure the positive adaptive fitness that these traits confer onto an object's user is poorly addressed by the selectionists. Rindos (1989:15) notes that fitness includes both reproductive success and symbolic meaning, but also goes "beyond simple genetic contributions to future generations." It is assumed the persistence of these traits reflects some form of an increased relative fitness for the object's user.

It would seem that determining fitness would be a goal of the selectionists; however, the bulk of their practical application is aimed at determining the functional "adaptiveness" of a trait. The most commonly advocated way to test a trait's functional adaptiveness is through what many selectionists call "engineering studies" (Braun 1987; Jones et al. 1995:27; Neff 1992, 1993; O'Brien and Holland 1990, 1992, 1995; O'Brien et al. 1994). These studies include examining paste characteristics of ceramic vessels for resistivity to thermal shock or for understanding the chemical signature of the paste for clay sourcing.

The way selectionists use the concept of reproductive fitness to address functional adaptiveness and selection is slightly misleading. Rather than using fitness as a measure of relative reproductive success, selectionists discuss fitness in terms of artifact reproductive success, which assumes that artifacts have the capability to reproduce. This also arises when artifacts are treated as a population (O'Brien and Lyman 2000), which implies to a certain extent that they are breeding populations in the biological sense. This also implies that some form of reproductive fitness for the artifact is conveyed by a trait's functional adaptiveness (Dunnell 1995; O'Brien and Lyman 2000). To address this contradiction, Leonard and Jones (1987) developed the concept of replicative success. Replicative success is simply the relative distribution of the trait through time and a greater distribution of the trait implies greater replicative success. To Leonard and Jones as well as others, this is where the concept of "differential persistence through time" (Leonard and Jones 1987:199) holds true. Leonard and Jones note that artifacts are not reproducing individuals and cannot be assumed to have a reproductive potential. A trait's replicative success may or may not have an impact on an individual human's reproductive success. Importantly, replicative success does not imply a mode of transmission, which in turn suggests that a lack of human behavior (intent or innovation) is involved in this process.

The differential persistence of functional traits is a result of selection, and selectionists attest that this variation is undirected (Lyman and O'Brien 1998; Rindos 1989). Selective processes, such as the genetic concept of recombination, are random and assume no specific needs of the organism; therefore, this variation is the product of processes that are not specifically directed toward the needs of the organism (Rindos 1989). Genetic variation is the cumulative result of an organism's evolutionary history, and the variation in the archaeological record is the cumulative result of a culture's evolutionary history. Stating that selection does not act directly toward the needs of an individual implies that it is undirected, which allows the selectionists to remove from evolutionary explanations the stigma of the cultural evolutionist idea of a developmental lineage from least to most complex and the adaptationism of cultural ecology.

Stylistic traits, on the other hand, are said not to affect an individual's fitness or reproductive success; therefore, these traits are called "selectively neutral" by the selectionists because selection acts neither for nor against these traits (Dunnell 1986; O'Brien and Lyman 2000). Whether or not the traits persist to the next generation is random and the selectionists associate this with the stochastic process of drift (Dunnell 1978; Jones et al. 1995; O'Brien and Holland 1992; O'Brien and Lyman 2000). Prehistoric pottery decorative types are shown to have changed through time, and are commonly used by archaeologists to chronologically determine the age of a site. The decorative forms are independent of the environment and are said to not enhance the pottery vessel's functionality; therefore, they do not impact a population's fitness. The question of whether or not these traits pose symbolic meaning that may increase or decrease the fitness of the possessor is moot to the selectionists because they feel that we as archaeologists cannot begin to understand symbolic meaning of prehistoric peoples.

The question of how inter- and intra-generation cultural trait transmission occurs, which should be the crux for the differential persistence of traits argument, is a subject that many selectionists avoid. It seems that the selectionists, while conceding that human intent is an important part of transmission (Lyman and O'Brien 1998; O'Brien and Lyman 200; Rindos 1989), do not place an emphasis on the role of human intent in the transmission of cultural traits (Lyman and O'Brien 1998; O'Brien and Lyman 2000). The selectionists feel that the scientific nature of evolutionary archaeology makes the recognition of intent in the archaeological record unverifiable (Lyman and O'Brien 1998; Rindos 1985) because intent occurs at the individual level.

Summary

The centerpiece of the selectionist perspective is the application of Darwinian evolutionary explanations to human culture. Artifacts and artifact traits are accepted as part of the human phenotype and are subject to the same evolutionary processes as genetic traits and their phenotypic expressions. To understand this process, selectionists first examine and quantify the differential persistence (variation) of artifact traits. The traits that are considered to have an impact on an organism's "fitness" are subjected to selection, and are frequently termed functional traits. The traits that are said not to contribute to fitness are selectively neutral because their persistence is random; therefore, these traits are subject to drift. Frequently, these traits are associated with stylistic elements of an artifact. Once variation is identified and tracked through time, narratives that explain this variation are devised. These narratives concerning human behavior are explicitly based on the Darwinian evolutionary principles of selection and drift.

The selectionists seem to be confident that their theoretical perspective has the greatest potential to address variation and change in the archaeological record and to explain the behavior that created this material (Lyman and O'Brien 1998; O'Brien and Lyman 2000). Although the perspective has a quite efficient methodology for identifying and measuring variation, which is not novel to the selectionist paradigm, it falls short of providing adequate interpretations and explanations of past human behavior. These shortcomings are addressed in the criticisms of the theoretical shortcomings of this paradigm (Boone and Smith 1998; Broughton and O'Connell 1999; Schiffer 1996; Spencer 1997).

The primary criticism of the selectionist perspective centers on the lack of human intent and innovation in the manner the selectionists depict the evolutionary process. (Boone and Smith 1998; Broughton and O'Connell 199; Schiffer 1996; Spencer 1997). Archaeologists generally agree that one of the primary goals for studying the archaeological record is to learn more about past human behavior. The selectionists agree with this position; however, they question the role that innovation and intent plays in human behavior. Because the concept of innovation has "too much of a connotation of conscious, thoughtful, or anticipatory intent," Lyman and O'Brien (1998:617) suggest it produces "intent-driven novelties" rather than being a source of variation. Intent is considered to be a proximate cause for change or variation rather than an ultimate cause, and because it is difficult to identify in the archaeological record it should be disregarded (O'Brien and Lyman 2000:85). This position on intent and innovation suggests that humans have no capacity to weigh the costs and benefits of a behavior. As the evolutionary ecologists point out, intent and innovation do not imply that a human is anticipating long-term adaptations, rather they allow for the weighing of trade-offs for short-term strategies (Boone and Smith 1998; Smith and Winterhalder 1992; Winterhalder and Smith 1992). It is difficult to identify and understand intent and innovation within the archaeological record, but this does not mean that these behaviors did not occur.

Evolutionary ecologists have questioned the selectionist's view that artifacts, as an extension of the human phenotype, and differential artifact frequencies can be explained by biological processes. In essence, they are substituting phenotype for genotype. This position fails to take into account what Boone and Smith (1998:S143) call the "replicator-phenotype distinction." Genetically, phenotypes are the cumulative effect of genetic and environmental factors. By substituting phenotypes for genotypes there is no replicator as phenotypes do not replicate themselves. The selectionist perspective has no vehicle for the transmission of replicators.

Maschner and Mithen (1996) have noted that the selectionist perspective relies on a group selection methodology that does not take into account individual perspectives. The selectionists would debate this perception, but Hartl and Clark's (1989:561) definition of group selection, which is "any kind of . . . change brought about by the differential extinction or proliferation of populations," is precisely what the selectionist methodology entails. This methodology relies on identifying and measuring variation of a population, and to them change is based on the relative frequencies of a population through time. The selectionist population consists of artifacts, and if one artifact unit or set goes "extinct" or "proliferates" there is change. The perception of artifacts as a population, and relying on identifying change based on the occurrence and frequency of these populations makes the selectionist methodology group selection.

Recently, O'Brien and Lyman (2000) advocated that a selectionist perspective was appropriate for historical archaeology. They are not clear why selectionism is an appropriate paradigm for historical archaeology; however, several assumptions can be made from their arguments. First, it has an implicit ability to create etic theoretical material culture units. Second, selection-based explanatory narratives use material culture lineages that rely on time as a continuous variable. Finally, they view it as the only way to explain change that is seen in archaeological patterns.

Selectionism does have a great potential for creating units that can be used to identify and measure variation in the archaeological record; however, it conflicts with some methodologies and goals within historical archaeology. First, emic perspectives that may generate important information about material culture function as it relates to relative fitness are ignored. Second, selectionism disregards individual intent and innovation. Finally, there does not appear to be a methodology to explain differences based on social stratification, gender, ethnicity, and race, especially because emic perspectives are excluded.

Given the selectionist paradigm's limitations, it would seem that a Darwinian evolutionary perspective may not be applicable to the study of historical archaeological farmsteads. As demonstrated below, an evolutionary ecological approach differs from the selectionist paradigm concerning intent and innovation and is more conducive to the methodologies and goals of historical archaeology. This evolutionary paradigm provides a more powerful explanatory methodology as applied to historical archaeology.

The Evolutionary Ecology Approach

Evolutionary ecology and the selectionist perspective do not differ greatly on the basic premise of their arguments: humans and cultures evolve; therefore, humans and cultures are subject to similar evolutionary processes. The difference between the two paradigms relates to the role that human intent and innovation have in cultural variation and change. Where the selectionists advocate the application of evolutionary principles to cultural material without taking into account individual human intent and innovation, evolutionary ecologists base their arguments on the evolved capacity of individual humans to weigh the costs and benefits associated with a strategy, and to optimize their own fitness in response to local ecological and social environments through innovation and intent (Boone and Smith 1998; Winterhalder and Smith 1992). Important to evolutionary ecology is the idea that "humans have remarkable capabilities to adapt their phenotypes to their environments through learning and rational calculation" (Boone and Smith 1998:S152).

Evolutionary ecology evolved out of behavioral ecology in the biological sciences where biologists are interested in asking questions about animal behaviors and environmental interactions (Krebs and Davies 1997). These questions, for example, can center around why birds have a certain clutch size, utilize a certain resource patch, maximize resources, or minimize resource allocation time. According to Krebs and Davies (1997:4), there are four ways to answer these "why" questions: function, causation, development (ontogeny), and evolutionary history (see also Tinbergen 1963; Winterhalder and Smith 1992:9-11a). Functional questions and answers address the "why" and "how" of understanding how an evolved behavior affects (contributes to) the survival of the animal and its offspring. Causation refers to the "intrinsic" and "extrinsic" factors that have caused an animal to select a certain resource patch. These factors are proximate causes because they involve the local environment. Ontogeny involves an individual's developmental history including genetics and transmission of social traits (behaviors) that influence an individual's decision making. Evolutionary history is a phylogenetic area that examines the history of the evolved behavior for the animal in question.

Evolutionary Stable Strategies

To derive answers to the "why" questions behavioral ecologists and evolutionary ecologists use what are known as evolutionary stable strategies (ESS) (Krebs and Davies 1997; Smith and Winterhalder 1992). Smith and Winterhalder (1992:34; see also Krebs and Davies 1997) note that strategies are considered ESS:

> When the relative payoff of alternative strategies or phenotypic traits depends on what other individuals in the population are doing, the outcome favored by natural selection depends on which alternatives are *unbeatable* rather than on which has the highest average payoff. (emphasis in original)

For example, where a bird feeds is dependent on where all the other birds go to feed (Krebs and Davies 1997). The behavior that is selected by individuals is reflected in the properties of the group (or population); therefore, it is likely that this behavior will be adopted by most of the population. Once the strategy or strategies have reached an equilibrium in the population (adopted by most members), it may not be changed by an alternative strategy (Krebs and Davies 1997:7). It is highly probable that no single strategy is an ESS; therefore, variance in behavior should be expected (Krebs and Davies

1997). As a result, it is common to examine a single strategy or a set of strategies to determine which is "unbeatable" through time.

An example commonly given in anthropology as an ESS are gaming theory models (Smith and Winterhalder 1992), which are derived from economic theories of relative payoffs that include explanations based in natural selection theoretical principles. The Hawk-Dove game and the Prisoner's Dilemma are both economic gaming theories that have been applied in anthropological settings (Smith and Winterhalder 1992).

The Hawk-Dove Game, for example, weighs the relative payoffs in a contest involving characters with fictional hawk and dove attributes (see Smith and Winterhalder 1992 and Dawkins 1976 for lengthier discussions). In this game, the hawk is the aggressor fighting for resources. The dove's tactics involve peaceful bluffing and flight once aggressive behavior is exhibited. Encounters between hawk and dove are scored according to their payoff in respect to relative reproductive fitness as a result of winning the confrontation. Acquiring the resource would rank the highest score, fighting and losing the confrontation would result in a very low score, and fleeing the fight confers a moderate score because there is no change in fitness. An equilibrium would be reached when the average relative payoff for hawk equals that of dove.

In ESS scenarios, there is no guarantee that the prescribed behavior will lead toward a maximization of fitness for the population. The actions of individuals may actually lead "in directions that produce collective consequences that are suboptimal to everyone" (Smith and Winterhalder 1992:37). This situation leads to what is called the Prisoner's Dilemma. In the Prisoner's Dilemma, the relative payoffs are considered in a situation where two (or more) individuals either have the opportunity to cooperate or defect (Winterhalder and Smith 1992). The highest payoff goes to the Defector in a situation where the other participant is the Cooperator, who receives the lowest payoff. The game in which both participants cooperate results in the second highest payoff. The final situation is where both defect, which has the second lowest payoff. This demonstrates that self-interest outweighs cooperative behavior; however, there must be a mechanism to enforce cooperation otherwise everyone would be a defector. This is where collective rules and regulations are put into place.

Both the Hawk-Dove Game and the Prisoner's Dilemma demonstrate that self-interest plays a role in decision making. This self-interest illustrates that population or group behavior is an accumulative affect of individual behavior. These models also show that the highest payoffs may be more advantageous for individuals than for the group. Most importantly, ESS models confirm that participants have the evolved ability to make decisions concerning their immediate relative fitness.

Optimization Models

Another behavioral ecology methodology used by evolutionary ecologists in anthropology to explain "why" are optimization theories (Bettinger and Richerson 1996; Boone and Smith 1998; Broughton and O'Connell 1999; Smith and Winterhalder 1992). For optimization analyses, individuals and individual intent are important to the overall explanation because these models are based on the premise that natural selection and learned behavior have shaped how individuals respond to their local environment

(Bettinger and Richerson 1996). Each optimization study has four basic elements: an actor, a strategy, a currency, and a set of constraints (Smith and Winterhalder 1992:50; see also Boone and Smith 1998; Broughton and O'Connell 1999). Krebs and Davies (1997:6) identify three elements: choices; what is being maximized; and constraints.

The actor is an individual who is situated in a social and ecological environment posed with a problem, which generally relates to that individual's relative fitness, and has the ability to choose between different strategies that may or may not maximize the individual's fitness. The problem is a here and now situation that will have ramifications on future environmental situations, but this individual cannot anticipate these future situations; therefore, the decision is weighed as if the future is now. It is evolved phenotypic plasticity that will allow for an "adaptation" to these future situations (Boone and Smith 1998). This focus on individual-level mechanisms can enhance explanations that center on fitness maximization and rational (or nonrational) behavior.

The focus on individuals within optimization models, as well as ESS models, relates to the idea that "group properties" (i.e. culture) are the accumulation of an individual's behavior internal to the group or population (Bettinger and Richerson 1996; Smith and Winterhalder 1992). This is the same idea as the genetic concept that natural selection acts on individuals and that evolution represents the accumulation of individual selection in a population (Lewontin 1974). This perspective differs from the selectionist methodology that takes a group selection perspective.

In any given situation, there are different options or choices that are available for the actor to choose from. The strategy or set of strategies (strategy set) is the range of options available to the individual in this situation (Smith and Winterhalder 1992). The strategy set may be small, much like that in a Hawk-Dove Game, or large, like feeding locations available to a bird. The different strategy sets should be explicit because the relative costs and benefits of each should be weighed and the strategy sets ranked from highest to lowest payoff. Given incomplete transmission and learning, an actor may not have or be fully aware of all the strategy sets available; therefore, an individual may choose a strategy that is "good enough" rather than the one that maximizes their relative fitness (Smith and Winterhalder 1992). The problems with these "satisficing" models are there is no good way to determine what is "good enough," and "good enough" has no evolutionary meaning (Smith and Winterhalder 1992: 54).

The currency in an optimization model is the relative costs and benefits for undertaking an alternative in the strategy set. Comparison of each alternative's costs and benefits can provide an insight into which strategy set would maximize an individual's relative fitness. This comparison can be used to produce a set of predictions concerning the strategy that would have the highest relative fitness; therefore, making it the most optimal solution to the situation (Smith and Winterhalder 1992). Fitness, however, is a poor measure because it is a lifelong evolutionary measure that extends beyond current strategies and solutions, which are aimed at current fitness. Additionally, people generally do not make long-term fitness maximizing decisions but rank them by current cost and benefits. Smith and Winterhalder (1992) suggest a correlate to fitness is needed representing the short-term goals that are indicative of weighing costs and benefits. "Utility" is a term used by economists to represent the short-term psychological responses that weigh current costs and benefits. The shortcoming of both fitness and utility is that they are hard to operationalize in a manner independent of real-world actor decisions.

Constraints are those factors affecting the feasibility of an actor's decisions in light of the current social and ecological situation, which affect the payoff of the strategy (Smith and Winterhalder 1992). Extrinsic constraints are those factors "exogeneous to the actor . . . that are beyond the control of the actor" (Smith and Winterhalder 1992:56). These include the social and natural environment and the actions of other individuals (Hartl and Clark 1989). Intrinsic constraints are those factors "endogenous to the actor's phenotype" (Smith and Winterhalder 1992:56). Intrinsic constraints include those relating to abilities, such as behavior and cognition, and those relating to the actor's requirements, such as nutrition. There has been some interest in the cognitive constraints imposed on (or by) an actor, which relate to "limitations in the cognitive mechanisms and information that actors possess" (Smith and Winterhalder 1992:57). Boyd and Richerson (1985, 1992) and Neiman (1990) provide extensive analyses concerning information transmission and the affects of transmission on optimization. This translates into "individually variable constraints" because each actor interprets the costs and benefits differently based on the information and resources at hand (Smith and Winterhalder 1992). What may be seen as suboptimal behavior is really an actor doing the "best he can" with the information and resources available.

Evolutionary ecology models are constructed with a recursive hypothesis testing methodology (Boone and Smith 1998; Winterhalder and Smith 1992), a procedure beginning by building or generating hypothetical behavioral models that can be tested through observation and experimentation. The evidence at hand is then examined to determine if it is congruent with the model. Because not all models can be decidedly proven or completely rejected, the model may be reformulated and tested again.

The recursive quality of evolutionary ecological models allows for real world models (Winterhalder and Smith 1992). Evolutionary ecological models may seem simple in light of the complexities of real world situations; however, these simple models are flexible enough to allow the researcher to identify and correct errors concerning "variables, constraints, currencies, and other concrete elements" that may appear during the evaluation process (Winterhalder and Smith 1992:16). This process permits models to become more explicit regarding the variety of relevant information; therefore, the recursive quality of evolutionary ecological models allows for repeated testing of a model, ultimately leading to one that is representative of a real world situation.

Optimization models can be constructed as resource maximizing and time minimizing strategy set models (Hames 1992; Krebs and Davies 1997; Smith and Winterhalder 1992). Resource maximizers attempt to acquire resources at the highest possible rate, which leads to either an increase in time spent doing the activity or no change in the time allocated to the activity. This activity, to resource maximizers, is more fitness enhancing than alternative activities, such as parental care. Time minimizers attempt to complete an activity in the shortest amount of time possible, which does not necessarily translate into increased resource acquisition and does not imply an overall increase in that activity. This means that the decreased time spent at that activity can be used in other fitness enhancing activities such as child rearing. In time minimization/resource maximization models, fitness maximizing behavior is generally allocated into two types: somatic and reproductive (Hames 1992). Somatic behavior relates to survival and well-being, e.g. foraging. Reproductive behavior relates to mate investments and parental care. Neither are exclusive as somatic efforts ultimately relate to reproductive behavior.

The costs in resource maximization/time minimization models are weighed on the benefits of choosing one behavior over another (opportunity costs) and the amount of resources expended performing an activity (resource costs). Because resource costs are difficult to directly determine (Hames 1992), the amount of time spent at an activity is used to indirectly determine resource costs. An opportunity cost model (see Hames 1992:205) would demonstrate that as time spent at an activity increases (opportunity cost), the rate of return also increases. The optimal strategy is when the rate of return is the greatest for time expenditure. This type of modeling is most effective when time allocation and resource costs are directly related. These models can be further confounded by the effect of human social interaction, i.e. social stratification, that may require more resources.

In archaeology, evolutionary models can be confounded by the question: Is it synchronic variation or diachronic change? This question relates to the selectionist position that undirected natural selection is the cause for differential representation of traits, while the evolutionary ecologists place this on the evolved capacity of phenotypic plasticity. Differential reproduction reflecting evolutionary change, in the selectionist viewpoint, implies inter-generational transmission and is constrained by the amount of time between generations. Rapid changes such as electrification of the rural landscape, however, imply that variation and adaptation can occur at rates smaller than inter-generational, which represents changes that do not necessarily reflect differential reproduction. This short-term, rapid change to the evolutionary ecologists represents synchronic variation rather than evolutionary change. The accumulative affect of synchronic variation over time represents evolutionary change. This position is nearly identical to the selectionists position on change; however, the main difference, as alluded to above, is that the evolutionary ecologists feel that variation can represent more than just differential reproduction as a result of selection acting on a variant.

Summary

Like the selectionist perspective, evolutionary ecologists consider natural selection and drift as primary evolutionary mechanisms; however, evolutionary ecologists believe that the evolved capacity of phenotypic plasticity is reflected in the archaeological record rather than the effects of natural selection acting on artifacts. Human intent and innovation are important to evolutionary ecological models because these models are based on the premise of the evolved capacity for phenotypic plasticity, which implies individuals have the ability to respond behaviorally to social and ecological environments.

Evolutionary ecological models can be characterized as either Gaming Theory or optimization models. Gaming Theory models posit a situation with two or more actors weighing the costs of a behavior and its benefits to each actor. The possible actions are ranked according to relative fitness payoff. Optimization models have four factors; actors, strategy, currency, and constraints that are employed to determine the costs and benefits of a behavior, and how these behaviors will affect an individual's relative fitness. Both types of models rely on the above stated premise of phenotypic plasticity that implies the evolved capacity for humans to weigh the costs and benefits of a behavior.

Whether its application to archaeological instances are relatively more recent or its proponents are less vocal, the application of evolutionary ecological models to archaeological circumstances has not been as broad, nor as vocal, as those advocating selectionist models. Boyd and Richerson's (1985, 1992) work on cultural transmission probably represents the most well known case studies. Recent works by Boone and Smith (1998) and Broughton and O'Connell (1999), while advocating the evolutionary ecological position, are really critiques of selectionist models and methodology. The rhetoric is not as loud, but the lack of widespread application is just as limited.

The critiques of behavioral ecology in biology and evolutionary ecology in anthropology primarily stem from the role of intent in prescribed behavior. Krebs and Davies (1997) note the critics of behavioral ecology suggest it borders on genetic determinism, has an "everything is for the better" mentality, and applies an anthropomorphic quality to models of animal behavior. These critiques generally apply to the most extreme behavioral ecological models and the discipline has moved to a more centrist position regarding the creation and analyses of these types of models (Krebs and Davies 1997).

Evolutionary ecological models have also been criticized for the inclusion of human intent and innovation in the interpretation and explanation of past human behavior

(Lyman and O'Brien 1998). As noted above, the selectionists consider intent and innovation to be proximate causes of change but evolutionary ecologists believe they play an important role in individual human behavior. The selectionist perspective makes humans seem unable to participate in their own behavior, whereas the evolutionary ecology perspective makes humans active players in culture.

So why is evolutionary ecology more applicable to, and compatible with archaeology than selectionist based evolutionary archaeology? First, the perspective takes an individual approach that includes intent and innovation as important components to strategy models. Second, the theoretical models developed by evolutionary ecology can be applied to real world situations of social stratification, gender, ethnicity, and race because they take into account the cost and benefits of an individual's actions. Finally, the methodology is explicitly scientific relying on a recursive hypothesis testing procedure.

CHAPTER 3

THE UPLAND SOUTH CULTURAL TRADITION

The study of historic farmsteads in East Tennessee and elsewhere in the Upland South has taken an interesting route. The term "Upland South" was coined by cultural geographers to refer to the region encompassing Southern Appalachia and portions of the Ohio Valley, Midwest, and the Mississippi Valley (Kniffen 1965; McKelway 1996; Newton 1974) (Figure 3.1). Employing traits commonly associated with housing in the region, Kniffen (1965) and Kniffen and Glassie (1966) identified a "folk" tradition characterized by a diversified farming complex, wood oriented technology, cooperative family units, and a stratified society (Hill et al. 1987; Kniffen 1965; Kniffen and Glassie 1965; Newton 1974). Kniffen (1965) and Kniffen and Glassie (1966) proposed that the tradition developed as a result of migration of people and diffusion of ideas from the northeastern United States to the Upland South between the late 18th century and the early to mid 19th century.

The diffusionist theories of Kniffen and Glassie suggested that the movement of people and associated cultural traits from one area to another resulted in the formation of the Upland South cultural tradition; however, they failed to explain why and how this movement occurred and more importantly, the subsequent changes that occurred in the Upland South tradition. A strong proponent of the Upland South cultural tradition, Milton Newton (1974) views its development as an evolutionary process. Newton's

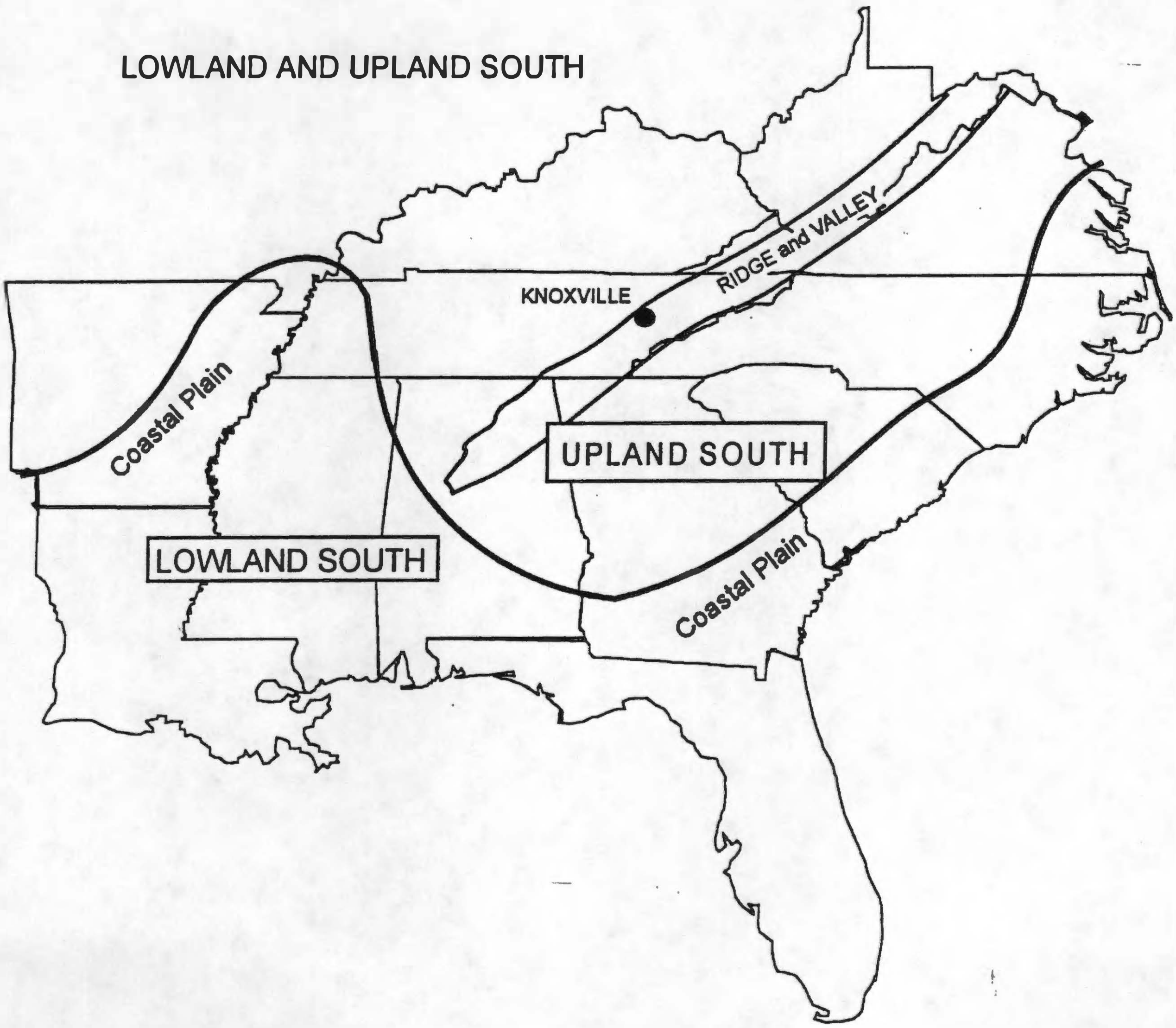

Figure 3.1. The Geographical Range of the Upland South Cultural Tradition (Adapted from McKelway 1996).

primary theoretical concept of "preadaptation" is grounded in Darwinian evolutionary theory whereby traits are selected because of their adaptive fitness. Preadaptation as an evolutionary concept in biology was formulated to "describe those mutations which were not immediately beneficial, but which would be useful . . . in the future" (Bock 1959:200). To Bock, an important influence on Newton's theoretical development, this means that structures are retained although they do not play a functional role. These developed forms became beneficial as the individual exploits a new environment and, more importantly, their presence actually allows the individual to exploit a new environment. Therefore, postadaptive changes become preadaptive traits in an evolutionary lineage.

Using preadaptation principles, Newton (1974) proposed that the successful traits of the Upland South cultural tradition developed in ancestral populations in the northeastern United States and in Europe. To Newton, cultural preadaptation is a "set of traits possessed by a particular human society or part of that society, giving that group competitive advantage in occupying a new environment" (1974:147). The period during which these traits developed he termed the Formation of Preadaptation because elements such as log construction, a generalized farming complex, dispersed settlements, and strong kin based ties allowed for the successful frontier settlement of the Upland South (Newton 1974:152). When people migrated to the southeastern United States, they brought these traits and behaviors with them. Newton proposed that between 1775 and 1825 there was rapid migration of people and diffusion of these traits from the Upland South to Texas, the Midwest and the Plains with little change in the traits. Subsequent to 1825, a period of "post adaptation" existed where the preadapted traits were modified to fit the local environment and new traits developed and implemented. Newton presented the Upland South preadaptive cultural traits as a static entity in order to give other researchers a frame of reference for future study.

Newton criticized the diffusionist and functionalist viewpoints of others, such as Jordan (1970) who used a "lingering-frontier approach" and a Lower South/Upper South dichotomy (Jordan 1967) to explain cultural development in north-central Texas, and Turner's (1920) "frontier process," because they rely on a synchronic view of frontier adaptation where traits developed on the frontier and continued unaltered throughout the 19th century. Newton, and to some extent Kniffen and Glassie, advocated a diachronic examination of cultural traditions. "History . . . " as Newton (1974:148) explains, "is inviolable; development must be traced." According to Newton (1974:148), a diachronic view allowed one to explain "the existence of forms" within their context while taking into account how these forms came into existence.

Upland South Cultural Tradition and Archaeology

Over the past 20 years, historic archaeologists have utilized the Upland South cultural tradition model to explain the cultural remains encountered during investigations of 19th century farmstead sites (Ahlman 1996, 1997, 1998, 1999; Ahlman et al. 1999; Groover 1993, 1998; Hill et al. 1987; Jurney and Moir 1987; Longmire 1996; McCorvie 1987; McCorvie et al. 1989; McKelway 1996; Moir 1987; Moir and Jurney 1987; O'Brien et al. 1982; Rotenizer 1992; Selby et al. 1984).

In order to facilitate the understanding of the past behaviors that created the archaeological record using material culture, historic archaeologists, using Kniffen's and Newton's Upland South farmstead characteristics as well as archaeological data on this site type, have developed a set of traits that are characteristic of the traditional late 18th and early19th century Upland South farmstead. These traits are what the selectionists (Dunnell 1986; Lyman et al. 1997; O'Brien and Lyman 2000) would call theoretical traits because the traits represent the ideal traditional Upland South farmstead and as such are not real. The frequency of these traits can be empirically measured through time, and as such are the building blocks to the study of variation. The traits of traditional Upland South farmsteads include (Moir 1987; Rotenizer 1992):

1. Outbuildings and barns arranged around a dwelling on a hilltop in a seemingly disordered cluster determined by the occupant's changing conceptions of convenience.

2. Major buildings are dwelling, barn storehouse, food storage shed or smokehouse, and animal pens, often serving multiple functions.

3. The location of the well, privy, storage shed, and chicken house is tied closely to the dwelling and form areas that are usually associated with female activities and are periodically swept.

4. Barns and larger animal and equipment shelters associated with male activity areas are located further away from the dwelling and its' closely tied support structures (mentioned in #3 above). Access to these structures is around the dwelling and its' yard rather than through the immediate yard.

5. Dwelling faces probable path of human approach.

6. Dwelling is shaded by trees.

7. Fields and pastures are irregularly arranged, often dictated by topographical features.

8. Widespread use of horizontal log construction.

9. Universal concept of modular construction is based on the pen or crib.

Ahlman (1996, 1999) and Groover (1993) have pointed out that the prevailing model is atemporal and atheoretical because it fails to explain or understand culture change in a diachronic manner. Ahlman (1997, 1999) has also pointed out that the model, as used by archaeologists, does not acknowledge variation between farmsteads. When variation is acknowledged, it is usually attributed to ethnicity rather than random variation (Longmire 1996). This essentialist approach of typological ascription fails to address population wide variation. Unfortunately, many applications of the model to interpret past farmstead activities, mostly on the fringes of the Upland South culture region (Hill et al. 1987; Jurney and Moir 1987; McCorvie 1987; McCorvie et al. 1989; Moir and Jurney 1987; Moir 1987; O,Brien et al. 1982; Rotenizer 1992; Selby et al. 1984), have followed this path. These studies examine the persistence or characteristics of the traditional Upland South traits on 19th century farmsteads by people who migrated to north-central Texas and southern Illinois from Kentucky, North Carolina, Tennessee, and Virginia. The Upland South model is used as an archetype for interpreting the archaeological record by comparing cultural remains, primarily architectural remains and archaeological features, to the traditional pattern to determine if a farmstead conforms to the model. Problems arise when these comparisons consider the traits representing the *ideal* traditional Upland South farmstead as *real* traits. First, the archetypical Upland South farmstead holds all of the above listed characteristics and normative comparisons and typological thinking fail to take variation into account. Second, diachronic change and variation across time and space are rarely noted as characteristics of the model although landscape changes are considered a primary characteristic of the model (see trait 1 above).

The variation in traits across time and space in Upland South farmsteads is not accounted for by a model that does not take time into account. An example of the diachronic shortcomings of the traditional Upland South model, because it focuses on the early 19th century, is its' failure to recognize farmsteads that were experiencing changes in the late 19th and early 20th centuries. New technologies in the late 19th and early 20th centuries created new farming methods and construction materials that were being utilized on farms throughout the United States. In order to address the multitude of late 19th to early 20th century farmsteads that have been recently recorded in the Upland South in response to cultural resource management studies, Ahlman (1996) developed a model based on an ideal "modern" Upland South farmstead. Using information obtained from early 20th century scientific farm journals and books as well as government publications, a set of traits was organized that define a modern Upland South farmstead, similar to the traditional Upland South farm. The traits derived from these various sources are indicative of *ideal farms*, not real farms, acknowledging that *few if any* farms would include all of these traits. The ideal modern farm would include all or a combination of the following traits (Ahlman 1996):

1. Buildings with concrete foundations or concrete slab construction, siding, electricity, and indoor plumbing.

2. Absence of smokehouses, food storage shed and/or privy.

3. Reliance on mechanized farming.

4. Frame or board and batten housing.

5. Abandonment of activities performed in the traditional yard.

6. Appearance of silos adjacent to barns.

These traits can be treated as theoretical units that allow for empirical measure and the identification of variation through time.

A shortcoming of the modern Upland South farmstead model is it does not take into account a farm consisting of either all traditional or modern traits. Research (Ahlman 1996; Cabak and Inkrot 1997; Cabak et al. 2000) has shown that in the early 20th century, many farmsteads incorporated both modern and traditional traits and neither modern nor traditional traits predominate on the landscape; therefore, a transitional category was constructed (Ahlman 1996). The main characteristic of the transitional farmstead is the coexistence of traditional and modern traits; however, no set of traits defining a transitional farmstead was developed (Ahlman 1996; Cabak et al. 2000). The studies that examined "transitional" farmsteads generally followed the axiom that a transitional farmstead included a slight majority of modern traits relative to traditional traits. Such elements as farm mechanization and electrification were also factored into the assessment. The occurrence of mechanization or electrification generally would make a farmstead either transitional or modern depending on the number of other modern traits. The transitional farmstead can be treated as an analytical unit because it was not created to represent *real* farmsteads. In essence, its existence is totally theoretical as the concept of a "transitional" farmstead does not seem to have occurred in the literature of the early 20th century. More importantly, variation is inherent to the transitional model because of the implied deferential acceptance or implementation of modern traits by farm families.

Applying Evolutionary Theory to Upland South Farmsteads

Darwinian evolutionary theory has been sparingly applied to historical archaeological situations (Ahlman 1999, 2000a; Neiman 1990; O'Brien and Lyman 2000), with most taking a selectionist perspective (Ahlman 1999; Neiman 1990; O'Brien and Lyman 2000). The selectionist perspective is quite effective at identifying variation, but is not as proficient in explaining variation or change as evolutionary ecology.

Ahlman (2000a) developed an evolutionary ecology optimization model that applied resource maximization/time minimization strategies to early 20th century farmsteads from East Tennessee and the South Carolina Piedmont. This study employed extensive archaeological and archival data from farmsteads in these two areas. The archival data were especially important and quite extensive because the federal government collected the information prior to acquisition of the properties. These data include information about tenure class, crop production, and building construction methods and materials among others.

In Ahlman's model (2000a), which is primarily applicable to 20th century farm families, resource maximizers focus their production toward the greatest return on their crop or product regardless of the amount of time required for the task. The resource maximization strategies are listed in Table 3.1. The costs to a resource

Table 3.1. Strategies for Early 20th Century Farm Families (Adapted from Ahlman 2000a).

Strategy No.	Strategy Description
Resource Maximization	
1	Mechanization and modernization of the farm complex to increase production, which would require greater efforts to meet the demands of upkeep and new construction.
2	Either mechanizing or modernizing buildings to increase production, resulting in mechanization without a concomitant building modernization or vice versa.
3	Not mechanizing or modernizing *any* farm buildings because of the drain on already stressed resources, resulting in a continuation of existing practices.
4	Completely leaving farming to pursue a career that appeared to have an even greater return on invested labor.
Time Minimization	
1	Mechanization and modernization of the farm complex to reduce time and effort in crop production while not increasing net production.
2	Either mechanizing or modernizing buildings to decrease work time, resulting in mechanization without a concomitant building modernization or vice versa.
3	Not mechanizing or modernizing any farm buildings because it would result in increased production time, resulting in a continuation of existing practices.
4	Completely leaving farming to pursue a career that appeared to be less time consuming.

maximizer in this model are less time spent at child-rearing and immediate leisure activities, while the benefits include potentially greater immediate and accumulated wealth and, given the right strategy, more time for leisure activities later in life. Ahlman (2000a) concluded that resource maximizers tended to have larger plots of land and were more likely to undertake modernization improvements in an effort to obtain a greater return on their invested labor.

Farm families classified as time minimizers would spend as little time possible in crop production and subsistence activities to focus on other behaviors. Their strategies are listed in Table 3.1. The costs to a time minimizer in this model are less accumulated wealth, while the benefits would be more immediate leisure and child-rearing time. Ahlman (2000a) noted that time minimizers tended to occupy smaller plots of land that produce less, and if the farm's occupants were tenants they were more likely to be transient. For these reasons, they have fewer motives tying them to the land; therefore, it would be beneficial for them not to undertake costly modernization improvements.

It was concluded that the majority of the East Tennessee farm families were resource maximizers falling into either Strategy 1 or 2 because they were undertaking modernizing improvements, and in some cases were mechanized. The fact that they also farmed relatively large plots of land further suggested they were resource maximizers. The remainder of the East Tennessee farm families were concluded to be time minimizers in Strategy 2 because they were modernizing but farmed small plots of land. The majority of the South Carolina farm families were determined to have been Strategy 2 time minimizers because they were modernizing but generally farmed small plots of land. A few of the farm families probably could have fallen into Strategy 1 and/or be a resource maximizer, but the lack of data from the South Carolina study made these determinations difficult.

This optimization model is generally applicable to early 20th century farmsteads because it focuses on farmstead modernization by farm families. Modifications to this model can make it applicable to a wide range of Upland South farmsteads. These modifications have to take into account that most archaeological studies of Upland South farmsteads do not have the same level of information employed by Ahlman (2000a), cover a wider geographical area in the study, and include many farmsteads with a greater time depth.

An Evolutionary Ecological Model for Upland South Farmsteads

A resource maximization/time minimization optimization model for Upland South farmsteads needs to take into account several factors. First, is the relatively long time period (in historical archaeological terms) that the cultural tradition has been recorded archaeologically. This length of time, an approximately 150 year time period from the beginning of the 19th century to the mid 20th century, would imply some degree of cultural change or at least phenotypic change. Second, is the wide geographical range of the tradition. As noted previously, the tradition extends from Southern Appalachia and includes portions of the Ohio Valley, Midwest, and the Mississippi Valley (see Figure 3.1). Although this is technically all one cultural region, there is localized variation, especially relating to agricultural production, that may have an effect on farmstead composition.

Third, the model also needs to address the issues of social stratification, ethnicity, and gender. Finally, the model should account for a wide range of variation among the farmsteads due to these factors.

Although there are many activities that a farm family may undertake during a day, week, month, or year, there are several that require a bulk of a family's time, energy and resources: agricultural production, including the raising and processing of crops and tending of animals for commercial sale; food production, involving the raising and processing of crops and tending of animals for home consumption and commercial sale; child rearing, not only including care through adulthood but also support and assistance during adulthood; and leisure time that involves a myriad of activities. Although these actions require the bulk of a farm family's time, energy, and resources, not all of a family's time, energy, and resources can be allocated for each behavior simultaneously. Consequently, there must be a trade-off between certain behaviors that the family determines to have the best strategy to maximize their relative fitness.

The investment of time, energy, and resources into the first two activities, agricultural and food production, is fairly straight forward. Agricultural production includes planting, cultivating, harvesting, and processing crops, such as grains, hay, or strawberries, and/or tending of animals, such as cattle or hogs, for commercial sale. The structures and features associated with agricultural production behaviors typically include storage for surplus grains; facilities for the storage and repair of agricultural implements; barns, sheds, and pens for holding and sheltering animals; and processing facilities. Food production includes the same behaviors, as well as the associated structures and features, but for household consumption and commercial sale. These activities typically occur at a smaller scale and may include a different suite of crops, such as potatoes and peas, and animals, such as chickens.

Most often crops are grown and animals are tended for both commercial sale and household consumption. Some crops or animals, however, may initially be grown for household consumption but if a surplus is produced some is commercially sold for a profit. The converse of this is also true with crops or animals grown primarily for commercial sale but only enough may be produced for household consumption.

The actions associated with agricultural and food production can be considered short-term behaviors because the ultimate goal is to make sure that enough of a crop is harvested at the end of the growing season to meet the family's needs, both household and commercially. The proximate goal is to have enough surplus for sale, especially regarding agricultural production, and to store reserves for use over the winter and until there are crops available for harvest the next year. There is a variable amount of investment in the behaviors associated with agricultural production because of the cyclical nature of crop production. The activities relating to production are cyclical because there are times of highly intensive activity, during planting, or when there is little to do, during periods of rain. During the winter, and "down-time" periods during the spring through fall, there is also less intensive activity relating directly to crop production but there are many indirect activities like repair of equipment or general farm upkeep.

Child rearing and leisure time are behaviors that are more difficult to address in relation to the allocation of time, energy, and resources. Child rearing is a life-long strategy, primarily because an investment in children can translate into greater overall relative reproductive fitness for an individual. It is important, therefore, to make some level of investment in child growth and development. Investments in child care can become costly involving high investments in both time and resources. These investments are typically more costly to women, who undertake the bulk of the child care activities. A relatively greater investment in child care for women translates into relatively less time allocated for food production activities such as raising a garden or canning, which are also important strategies for insuring reproduction and proper child growth and development. To meet the needs for a child's growth and development there must be a minimal investment in both the strategies of child care and food production. A greater investment in one does not necessarily translate into less investment in the other. There is a trade-off by the farm family between the two strategies as to which one is perceived to convey a greater relative fitness and to which the family will devote the bulk of its time, energy, and resources.

In addition to the trade-off between child care and food production, there can also be a trade-off concerning the number of children in a family and what is perceived as a better investment of time, energy, and resources. A relatively larger number of children in a family can mean a greater probability for a spread of those genes; however, more children can also result in fewer resources for proper growth and development. In addition, there may be fewer resources available for additional education, which can affect information transmission and the rate of information acquisition by an individual (Boyd and Richerson 1985; Neiman 1990). Relatively fewer children means a lower probability for the spread of an individual's genes; however, there can be a greater investment of time, energy, and resources in overall child care. This investment can mean a higher probability of proper growth and development as well as a greater chance for education.

The number of children in a family can also have an affect on which strategy a family may choose. A relatively greater number of children will usually mean a larger workforce on the farm. This would allow the family to invest more time and resources into the cultivation of larger areas of land. This can also mean that there is more labor available to finish tasks in a shorter amount of time; therefore, there is more time for child care or leisure activities. Relatively fewer children can mean a smaller labor force within the immediate family to undertake agricultural and/or food production activities. Under this scenario, there can be a greater investment in non-family labor (i.e. hired laborers) because fewer resources are being allocated to child care. Investing in non-family labor can also mean more free time for investment in child nurturing and socialization.

Leisure time is also a difficult behavior to analyze because some behaviors that seem to be leisure activities, and may have been perceived as such while the individual was undertaking them, may actually be fitness enhancing. For instance, fishing, hunting, and trapping, which can be viewed as leisure activities, can provide needed resources for the family. These actions may require an extensive investment of time and capital as well as take time away from child rearing and leisure time. By the late 19th century, however, these activities probably were not economically feasible food acquisition strategies as they were in the late 18th and early 19th centuries. These activities did, however, enhance the transmission of information from parent to child, were beneficial to child-parent bonding, and provided needed information a child could use in future situations. Social activities like church socials or belonging to organizations such as the Free Masons can be perceived as leisure time behaviors but may actually have a direct affect on an individual's or family's social standing, thus enhancing their fitness. The attendance of these functions was probably seen by the family as fitness enhancing and may have been encouraged.

There are behaviors that can be perceived as obvious leisure time activities: starting work late or ending early; relaxing during or at the end of the day; socializing; drinking alcoholic beverages; and gaming. These activities can be considered leisure but may also have been perceived as being slothful by others within the family or community and then affect a person's social standing. In addition, these behaviors can be maladaptive (Logan and Qirko 1996) because drinking alcoholic beverages and gambling can lead to addictions where inordinate amounts of money are wasted on these behaviors rather than being used for the enhanced fitness of the individual and family.

Strategies and Archaeological Correlation

It is proposed that the archaeological recognition of a strategy's behavior can be determined by examining architectural and archaeological structures and features most often associated with various behaviors and activities (see Ahlman 2000a). As noted above, the Upland South cultural tradition is based on the occurrence of a suite of buildings, which are indicators of temporal differences and various behaviors and activities. The different structures associated with a certain behavior are listed in Table 3.2. Multiple activities may have occurred in some buildings, such as the dwelling, and the most common activity associated with that location is listed. Some buildings occur in more than one category because there is an equal likelihood that either activity occurred there. A good example is a chicken house, where poultry may have been raised for home consumption or sold to neighbors. Child rearing and leisure activities leave few architectural signatures; however, a relative lack of structures at a farm does not mean that these activities did not occur. This suggests that there may have been a focus on these activities rather than on agricultural and food production activities. Identifying and measuring the relative occurrence of outbuildings or activity areas representative of a behavior will provide the needed insight into the variation that is indicative of different strategies.

Variables

The theoretical variables listed in Table 3.2 are meant to be represent the behaviors associated with the different strategies available to Upland South farmsteads. This list, however, is by no means an exhaustive treatment of the types of buildings present at Upland South farmsteads. The theoretical variable sets representing the different strategies are non-inclusive and, as shown in Table 3.2, some variables occur in two or more sets. Some behaviors are difficult to detect based on structural data alone because they do not leave structural remains. It is assumed that the absence or near absence of certain variables explicitly relating to agricultural and food production suggests that other

Table 3.2. List of Structures and Features Associated with the Strategy Behaviors.

Agricultural Production	**Food Production**	**Child Rearing**	**Leisure**
Barn/Stable	Dwelling	Dwelling	Dwelling
Crib	Detached Kitchen**	Privy	
Pens	Root Cellar		
Hog House*	Wood Shed		
Chicken House*	Hog House*		
Sorghum Furnace	Chicken House*		
Blacksmith Shop**	Smokehouse/meat house		
Machine Shed	Shed*		
Shed*	Vegetable Bed		

* = Evidence for either strategy.
** = Not used in statistical analysis (see below for explanation).

activities were occurring, and implies the farm family had undertaken a strategy not directed at those behaviors.

The variables listed in Table 3.2 do not include all the variables collected for this analysis. Table 3.3 lists the 25 variables collected for the 129 farmsteads used in this analysis. As will be discussed in the following chapter, certain variables that occurred infrequently (in less than five percent of the population), caused the statistical programs to load on these variables. As a consequence, some variables were concatenated into more inclusive categories and some variables were removed completely resulting in 14 variable categories. The complete data set including the occurrence all 25 variables among the farmstead sample is provided in Appendix A.

The concatenated categories include variables with similar functions that are indicative of like behaviors. The food storage feature category includes cellars, dairies, vegetable beds, potato sheds, and berry sheds. The garage variable includes garages, machine sheds, and tool sheds. The agricultural processing feature variable includes sorghum furnaces, dairies, and milk barns. Additionally, the barn variable includes stables and cattle sheds. The blacksmith shop and detached kitchen occurred at only one and three farms, respectively, so they were removed from the statistical analysis. The dwelling was also removed from the analysis because it was constant throughout and had no effect on the results. The "undifferentiated shed" variable refers to sheds denoted on the TVA land acquisition map where no specific function is listed or general remains identified archaeologically.

Table 3.3. List of Variables Used in the Farmstead Analysis.

Recorded Variable	**Associated Behavior or Activity**	**Used in Analysis (yes/no)**	**Concatenated (Yes/No)**	**Concatenated Variable Name (if applicable)**
Dwelling	Food Production, Child Care, Leisure	No	No	
Barn	Agricultural Production-facility for animal husbandry	Yes	No	
Corn Crib	Agricultural Production-storage of crops intended for animal feed or for commercial sale	Yes	No	
Hog House	Agricultural and Food Production-building for holding swine	Yes	No	
Cattle Shed	Agricultural Production-building for holding cattle	Yes	Yes	Barn
Chicken House	Agricultural and Food Production-building for holding chickens	Yes	No	
Sorghum Furnace	Agricultural Production-processing facility of sorghum to make sorghum molasses	Yes	Yes	Agricultural Processing
Blacksmith shop	Agricultural Production-facility for the construction and repair of agricultural implements	No		
Stable	Agricultural Production-barn type structure for holding horse, mules, and/or cattle	Yes	Yes	Barn
Machine Shed	Agricultural Production-facility for the repair and storage of agricultural implements	Yes	Yes	Garage/Machine Shed

Table 3.3. (continued).

Recorded Variable	**Associated Behavior or Activity**	**Used in Analysis (yes/no)**	**Concatenated (Yes/No)**	**Concatenated Variable Name (if applicable)**
Undifferentiated Shed	Agricultural and Food Production-typically a shed with an unknown function but probably served either function	Yes	No	
Berry Shed	Agricultural and Food Production-facility to store surplus fruits	Yes	Yes	Food Storage
Detached Kitchen	Food Production, Child Care, Leisure-facility for cooking food and may serve as a leisure location in an informal manner	No		
Spring House	Food Production, Child Care-storage facility for surplus food crops and may serve as water source	Yes	Yes	Spring House/Well House
Well House	Agricultural and Food Production, Child Care	Yes	Yes	Spring House/Well House
Smoke house/meat house	Food Production-facility for curing and storing meat and other food products	Yes	No	
Wood Shed	Food Production-facility for the storage of wood, typically for the house	Yes	No	
Root cellar	Food Production-facility for the storage of surplus food crops	Yes	No	

Table 3.3. (continued).

Recorded Variable	**Associated Behavior or Activity**	**Used in Analysis (yes/no)**	**Concatenated (Yes/No)**	**Concatenated Variable Name (if applicable)**
Vegetable Bed	Food Production-facility for the storage of surplus food crops			
Potato Shed	Food Production-facility for the storage of surplus food crops	Yes	Yes	Food Storage
Well/Cistern	Agricultural and Food Production, Child Care, Leisure	Yes	No	
Silo	Agricultural Production-facility for the storage of surplus crops	Yes	No	
Dairy	Agricultural Production-facility for milking cattle and/or storing milk products	Yes	Yes	Food Storage
Garage	Agricultural Production, Leisure-facility for storing and repairing cars and agricultural implements	Yes	Yes	Garage/Machine Shed
Scale House	Agricultural Production-facility for weighing surplus crops	No		

The data for the variables were collected as continuous (the number actually reported for each farmstead) in order to determine a specific number of buildings or activity areas identified at each farmstead. These data, however, are misleading because farmsteads occupied for 150 years may have had multiple smokehouses whereas a farm occupied for just 25 years may only have one. As a consequence, the data were converted to a categorical scale based on the occurrence (presence or absence) of a variable at a farmstead. In essence, this treats each farmstead as a static entity that assumes the farm families that occupied the farms through time undertook the same strategy. This premise further assumes that the social and ecological constraints acting on the families that occupied the farm remained fairly constant through time. This applies to both biologically related and biologically unrelated families that occupied a farmstead. A case study that demonstrates this consistency is addressed in greater detail in Chapter 6.

Treating the farmstead occupations as static contrasts with Groover's (1998:337) assumption that "each household will potentially leave a specific pattern of site use that is *mutually exclusive* from imprints generated from previous households" (emphasis added). Groover applied this concept to sheet midden size, disposal areas, consumer purchasing habits, and to changing outbuilding function. Groover (1998:785) believes changes in outbuilding function are related to major changes in household cycles and are reflected in "generational" and "household" imprints. He notes a pit cellar location converted into a smokehouse by a later generation (Groover 1998:785) which indicates a change in function of the feature; however, this does not indicate a change in the general strategy undertaken by the farm's occupants because both features represent a food production behavior. Groover's presumption of mutually exclusive generational and household imprints assumes that each succeeding farm family would be taking different strategies. This is possible, but given the social and ecological constraints acting on farm families it is unlikely.

Ahlman (1996) has demonstrated that Upland South farmsteads were undergoing a change in the early 20th century as a result of modernization and agricultural industrialization. An examination of the data used in this analysis indicates the occurrence of many of the same building types at these farms which are commonly associated with 19th century (traditional) Upland South farmsteads (see Ahlman 1998; Ahlman et al. 1999; Groover 1998; Hill et al. 1987; Jurney and Moir 1987; Longmire 1996; McCorvie 1987; McCorvie et al. 1989; Moir and Jurney 1987; Moir 1987; Rotenizer 1992). Ahlman's analysis, however, indicates that modernization was having a greater affect on construction materials and methods rather than on the number and type of buildings. This implies that these variables were available as viable options to Upland South farmsteads from the early 19th century through the mid-20th century. In addition, this demonstrates that farm families were probably undertaking the same strategies, even during the transition to industrialized farming.

Converting the data from continuous to categorical removes the effects that multiple buildings existing at the same time, such as barns, may have on the analysis. Including these multiple counts within the analysis can result in loading on certain variables that may affect the analysis. The occurrence of four barns, three cribs, two hog houses, one smokehouse, one chicken house, and one cellar that are contemporaneous, however, would demonstrate a greater investment in agricultural production relative to food production. The occurrence of these variables demonstrates a difference between that farm and one that only had a barn and a smokehouse.

Resource Maximization Model

A resource maximization strategy set focuses on actions that maximize the resource return from agricultural production and/or food production. Because this strategy requires more time and energy allocated toward resource production and processing, the trade-off is less time and energy allocated to other actions such as child-rearing or leisure time. The costs for undertaking a resource maximization strategy include, but are not limited to, less time, energy, and resources allocated to child-rearing and/or leisure time. This does not mean that there will be insufficient resources allocated for proper child growth and development, but rather there may be less time spent for nurturing and familial education. The less time, energy, and resources allocated to leisure activities may mean less time to relax as well as time and resources spent in social activities that may affect social standing. It is important to remember that resource maximizers are not immune to maladaptive behaviors. They are just as likely to undertake behaviors such as drinking and gambling that can waste money and decrease relative fitness levels.

The primary benefit for a resource maximizer for undertaking this strategy should be relatively greater immediate and accumulated wealth than a time minimizer. Wealth is a difficult concept to define because wealth can mean different things to different people. In this context wealth refers to the differential access to goods, which can result in social stratification and class differences (Leone and Potter 1989; Orser 1996). Greater wealth obtained through this strategy can be further used to enhance a farm family's social standing by providing better education for children, building a dwelling that reflects wealth, modernizing the dwelling and outbuildings with current conveniences, or being able to join local and regional groups or societies that represent wealth and power. These activities may not seem congruent with a resource maximization model because they take time away from resource procurement, but they themselves require more resources in order to afford the monetary costs associated with each activity. Another benefit associated with greater wealth is that more land can be acquired and non-family help can be hired for agricultural production. This means that the hired-help (household help, wage laborers, sharecroppers, or tenants) have to work harder in order to meet the demands of their employer or landlord; however, time minimizers, like tenants or share croppers, may undertake other strategies, such as cultivating less land or making fewer farm improvements, that contradict the strategies of a resource maximizer (see Ahlman 2000a).

A resource maximization set of strategies must focus on activities the farm family undertakes to maximize agricultural and food production returns for their investment of time, energy, and resources. The strategies are provided in Table 3.4 with the proposed archaeological signatures of these strategies using architectural and archaeological features. The strategies are ordered from the one with the highest relative potential payoff

Table 3.4. Resource Maximization Strategy Model for Upland South Farm Families.

Strategy No.	Strategy Description	Archaeological Signature
1	Focus time, energy and resources toward *both* agricultural *and* food production.	Relatively high occurrence of both agricultural and food production structures. Relatively high diversity among the farmsteads in the types of structures and features.
2	Focus time, energy, and resources on agricultural production rather than food production.	Relatively high occurrence of agriculturally related buildings relative to food production structures and features.
3	Focus time, energy, and resources on food production rather than agricultural production.	Relatively high occurrence of food production buildings relative to agricultural production structures and features.
4	Focus time, energy, and resources on other activities not related to agricultural or food production.	Relatively few outbuildings or features.

to a resource maximizer, which reflects an emphasis on agricultural and food production, to the one with the lowest relative potential payoff to a resource maximizer.

Time Minimization Model

Agricultural and food production are also important to time minimizers, but only with a minimal investment of time, energy, and resources, relative to resource maximizers, to complete these activities with results sufficient to meet the needs of the family. These strategies, therefore, focus on actions other than agricultural and/or food production, such as child rearing or leisure activities. The time minimizer set of strategies are listed in Table 3.5 with the proposed archaeological signatures of these strategies reflected in architectural and archaeological features.

Because time minimizers are undertaking a strategy that probably provides the necessary resources for somatic growth and reproduction but not consistent surpluses, there probably is little surplus produce for commercial sale; therefore, the primary cost to a time minimizer is less accumulated wealth relative to a resource maximizer. The money derived from commercial sales would have provided household items like plates, cloth, or sugar. Assuming the possibility of maladaptive behavior (Logan and Qirko 1996), the money may have been used to purchase excessive amounts of alcohol or gambled away. Less wealth from commercial sales implies that there will be limited investment in the dwelling and outbuildings, fewer chances for advanced education, and fewer opportunities to be involved in groups or societies that are indicators of wealth, social stratification, and class.

Table 3.5. Time Minimization Strategy Model for Upland South Farm Families.

Strategy No.	Strategy Description	Archaeological Signature
1	Focus time, energy, and resources on activities with a minimal investment in agricultural and food production.	Fewer structures and features relating to agricultural and food production relative to resource maximizers.
2	Focus time, energy, and resources on activities other than agricultural and food production; however, there is a relatively greater minimal investment in agricultural production than food production.	Relatively lower occurrence of agricultural production structures and an even lower occurrence of food production structures.
3	Focus time, energy, and resources on activities other than agricultural and food production; however, there is a relatively greater minimal investment in food production than agricultural production.	Relatively lower occurrence of food production structures and an even lower occurrence of agricultural production structures.
4	Focus time, energy, and resources on activities other than agricultural and food production. There is almost no investment in agricultural or food production.	There would be relatively few outbuildings.

The benefits of a time minimization strategy can be more time, energy, and resources available for investments in child care and leisure activities. In this strategy, it does not mean that there will be equal or greater time invested into child care relative to resource maximizers because the "extra" time may actually be allocated to leisure activities rather than child care. Additionally, either the child care or leisure activities may be maladaptive.

These strategies are devised so that they are not at odds with Ahlman's (2000a) strategies and conclusions for early 20th century farmstead modernization. In both sets of strategies resource maximizers have a greater investment of time, energy, and resources in agricultural and/or food production reflected in a relatively greater investment in outbuilding construction and maintenance, more activities performed around the house, and a relatively larger area of cultivated land. Time minimizers generally have relatively fewer outbuildings and less investment of energy and resources in the maintenance and construction of these structures and will cultivate a relatively smaller area of land. Therefore, farm families classified as resource maximizers according to the early 20th century set of strategies should also be classified as resource maximizers under this model and the same should be true for time minimizers.

An important factor to keep in mind is that the strategies undertaken by farm families may actually change through time. Throughout the time period being studied there were numerous technological and social changes that influenced agricultural production. These changes should also be reflected in how farm families undertake various strategies. An example of this is Ahlman's (1996) study of early 20th century farmsteads in East Tennessee that indicates farm families were implementing modern construction materials and techniques to meet increasing demands of agricultural output as well as the changing social environment associated with modern conveniences like electricity. The evolutionary ecological model for these same farmsteads indicates this differential implementation of modern construction materials and techniques implied different strategies by farm families to either meet these needs or to minimize the requirements placed on them by these increasing demands.

Factors to consider are that farm families are constrained by their local physical environment and by other farmers in the area, which have an effect on the strategy they will undertake (Hartl and Clark 1989). These factors greatly influence the strategy a farm family undertakes and will be reflected in the material culture of the site. The Upland South is characterized by mountains, low hills, small valleys (hollows), and large river basins that can either be conducive or constrictive to agricultural production. These different topographic features can affect soil fertility, with bottomlands generally more fertile than the uplands, and can restrict arable land due to the degree of slope. A family that lives in a location that is restrictive in its agricultural production may undertake a strategy, such as time minimization, that they perceive to be the best use of their time and effort. Because the physical environment is a steady-state constraint (Hartl and Clark 1989:515), it can be overcome by undertaking a resource maximizer strategy, like animal husbandry, that may be more conducive to local environmental factors. Other factors, like advances in fertilization that improve soil fertility and increase crop productivity, can overcome these constraints but may be prohibitively costly to a family. It is presumed in this study that due to steady environmental constraints, the same strategy was undertaken by *all* the occupants of a particular farmstead.

Farm families are also constrained by factors relating to other farm families. First, a family that initially settles an area must clear the land, construct a dwelling and accompanying set of outbuildings, and determine which crops are best suited for the land. Second, a family that moves into an area after it has been settled must compete for the more productive land that was acquired by the initial settlers. They must either pay premium prices for the land or settle in an area where the soil may be less productive. Finally, as the population grows with each successive generation land is often divided between family members resulting in smaller plots of land that require more intensive cultivation or a change in strategy.

The different strategy sets indicate there is variation in the behavior of Upland South farm families and this behavioral variation should be reflected in the archaeological record of the Upland South farmsteads that these families occupied by the occurrence of different building types. The identification and measurement of this behavioral variation is crucial in demonstrating that farm families were in fact undertaking different strategies to maximize their fitness.

Statistical Methods

The identification and measure of variation among Upland South farmsteads will involve three statistical techniques: principal components analysis, cluster analysis, and correspondence analysis. These techniques are commonly used by physical anthropologists to identify and measure variation in discrete and continuous genetic and phenotypic variables (see O'Shea 1984). Each technique provides a means of identifying and measuring variation, and then deriving information that can be used to interpret and understand past human behavior.

Principal component analysis uses multivariate statistical techniques to summarize data and to detect linear relationships with maximum variance within a data set (Rencher 1995; SAS 1990). No variables are presumed dependent and the method assumes no prior grouping; therefore, "we are searching for a dimension along which the observations are maximally separated or spread out" (Rencher 1995:415). The component represents linear relationships of the variables within the data set. Derived component scores are arranged according to the amount of within group variance represented within the principal component. The first has the highest amount of variance, the second contains the next greatest percentage of within sample variation, and so on. This ordering concentrates the most variation in the first several components thereby reducing the dimensionality of the data. The principal components are orthogonal to each other, which allows for plotting and evaluation of the components. Principal component analyses typically uses continuous variables rather than categorical variables. By converting the presence/absence variables into an ordinal association scale, the data become continuous but maintain their categorical scoring.

Because the principal components are a summary of the variation present in a sample they can be used by other multivariate techniques to investigate within group variability. The principal components derived from this analysis that represent the greatest amount of within group variance will be used in a cluster analysis. Cluster analysis uses coordinate or distance data, such as principal components, to derive hierarchical clusters of observations in a data set (SAS 1990). Cluster analysis employs an average linkage clustering method to join clusters with similar variances. The linkage is derived from the average distance between pairs of observations, which form a cluster. Similar or closest clusters are merged, forming new clusters that replace the old clusters. Clusters are repeatably merged until there is only one cluster left.

The SAS (1990) procedure FAST CLUS is another cluster analysis technique that has one major advantage over a regular cluster analysis. This procedure uses the same methodology that a typical cluster analysis employs, but it allows the programmer to set the number of clusters to be derived from the analysis. The FAST CLUS procedure uses a nearest centroid sorting methodology (SAS 1990). The ability to set the number of clusters can be useful in analyses like the one employed here; however, the derived clusters may be formed by weaker linkages compared to the linkages derived from other cluster analysis procedures.

Correspondence analysis is another principal component analytical technique that is actually better suited for categorical data than typical principal component analysis, but the output data from correspondence analysis cannot be used by other methods, such as cluster analysis, to discern empirical relationships. Correspondence analysis is a "weighted principal component analysis of a contingency table" that produces a "low-dimensional representation of the association between rows and columns of a table" (SAS 1990:616). Rows and columns are represented by a "point in a Euclidean space determined from cell frequencies" (SAS 1990:616). The row and column profiles are "rescaled so that distances between profiles can be displayed as ordinary Euclidean distances and then orthogonally rotated to a principal axes orientation" (SAS 1990:617). As a result, distances between rows have relevance only to other rows and distances between columns have relevance to other columns. The graphical relationship between the two do not have interpretable meaning but do show the association within the rows and columns.

Expected Results

Through the use of these statistical methods, several results are expected that will ultimately aid in determining which farmstead occupants were undertaking which strategy. The principal components analysis is expected to show a linear relationship between the variable occurrences within the sample. Because a wide range of variation is expected within the sample, it is anticipated that the derived components used in the cluster analysis will indicate which farmsteads are similar based on the occurrence of the variables used in the analysis. It is hoped that this procedure will provide results that can be used to determine which farmsteads, and the families that occupied them, can be classified into the different strategy groups. For this reason, the FAST CLUS procedure will be set to derive eight clusters from the data set. It should be noted here that the cluster analyses are not expected to derive clusters that will perfectly group farmsteads according to strategies. Some degree of error is expected; therefore, each cluster and each individual farmstead will be examined following the cluster analysis to determine the strategy undertaken at each individual farm. The correspondence analysis procedure is expected to show the relative associations present among the farmsteads in the sample, and separately the variables used in the analysis. Ultimately, results of the statistical tests will demonstrate that there is variation within Upland South farmsteads, and that this variation translates into farm families undertaking different strategies to maximize the total relative fitness. In the end, the results derived from the statistical procedures will be used to determine which strategy the occupants of an individual farm had chosen to undertake.

CHAPTER 4

POPULATION PERSPECTIVE

The population under examination in this analysis includes all farms and farm families in a broad geographical area defined as the Upland South (see Figure 3.1). This population includes tens of thousands of farms and farm families; therefore, a sample of the population was selected for this analysis. The sample for this study was difficult to derive for the following reasons. Historic farmsteads have not received equal treatment archaeologically throughout the region. Also, much of the information is located in the "gray" literature of archaeological cultural resource management reports and locating these data is difficult. Finally, due to the constraints listed in the previous chapter there are differing levels of data available for farmsteads throughout the region.

In this chapter, the farmstead sample is described according to its temporal and geographical characteristics and similarities. This sample is then subjected to the statistical analyses discussed in the previous chapter. The results derived from the statistical analyses are used as the basis for a discussion concerning the implementation of the different strategies by Upland South farm families. Finally, conclusions are drawn about taking a population approach to the study of the strategies undertaken by individual Upland South farm families.

Farmstead Sample

The sample of 129 farmsteads selected for this analysis is listed in Table 4.1. The most obvious characteristic of the sample is the preponderance of East Tennessee farmsteads. One of the reasons for the inclusion of these farmsteads is the archaeological and archival data includes an abundance of information about the structures at these sites. The inclusion of these farmsteads, which were recorded during surveys of Tennessee Valley Authority (TVA) reservoirs, also weights the sample with sites that have early to mid-20th century occupations. The major benefit for including these sites is the abundance of information regarding the type and number of structures located at each farmstead. When the property was purchased by the government, fairly precise land acquisition maps were produced that labeled and depicted each building at a farm.

The sample includes data on 109 farmsteads from the lands in and around the Watts Bar (impounded in 1941), Cherokee (impounded in 1941), Melton Hill (impounded in 1963), and Tellico (land purchased in 1969 or 1970) reservoirs. The majority of the data about these farmsteads is derived from recent University of Tennessee surveys of these reservoirs (see Ahlman et al. 2000; Frankenberg and Herrmann 2000; Frankenberg et al. 2000; Herrmann and Frankenberg 2000). These farmsteads generally date to the late 19th century through the time of government acquisition. Ahlman (2000b; Hermann and Ahlman 2000) notes an increase in the number of farms toward the end of the 19th century that continues through the early 20th century, and this is reflected in the number of farms recorded archaeologically that date to this period. There are a few sites

Table 4.1. Upland South Farmsteads used in this Study.

Site Name	Site No.	State	Reference	Initial Occupation	Terminal Occupation	Strategy	Cluster	Strategy Set
.	40MG230	TN	.	.	1941	R	1	1
Gillespie/Boles	40RH208	TN	Ahlman 1996	1820	1941	R	1	1
Ramsey House	40KN120	TN	Faulkner 1995, 1996, 2000; Faulkner and Owens 1995	1796	1970	R	1	1
.	40RE261	TN	.	.	1941	R	1	2
.	40RH216/217	TN	Ahlman 1996	1870	1941	R	1	2
.	40MR619	TN	Frankenberg and Herrman 2000	.	1969	R	1	2
Exchange Place		TN	Owens 1996, 1998	1820	1971	R	1	3
The Old Jim McMurray Place	1FR297	AL	Bastian 1988	.	1976	R	1	3
Ellis Hendrix	1FR295	AL	Bastian 1988	1870	1976	R	1	3
Alfred Thorn	1FR292	AL	Bastian 1988	1860	1976	R	1	3
Gibbs Site		TN	Groover 1998	1792	1986	R	1	3
.	40LD326	TN	Frankenberg and Herrman 2000	.	1969	R	1	3
.	40MG225	TN	.	.	1941	R	1	4
.	40RE212	TN	.	.	1941	R	1	4
Fair View Farm	11SA336	IL	McCorvie et al. 1989	1850	1935	R	1	4

Table 4.1. (continued).

Site Name	Site No.	State	Reference	Initial Occupation	Terminal Occupation	Strategy	Cluster	Strategy Set
Tipton/Dixon House Site	40LD179	TN	Ahlman 1998/ Ahlman et al. 1999	1819	1969	R	1	5
.	40MG224	TN	.	.	1941	R	1	6
.	40MG271	TN	.	.	1941	R	1	6
.	40RH206	TN	.	.	1941	R	1	6
.	40MR669	TN	Frankenberg and Herrman 2000	.	1969	R	1	6
.	40MG241	TN	.	.	1941	R	1	6
.	40RE489	TN	.	.	1941	R	1	6
.	40RE277	TN	.	.	1941	R	1	6
.	40RE445	TN	.	.	1941	R	1	6
.	40HW123	TN	Frankenberg et al. 2000	.	1941	R	1	6
.	40HB46	TN	Frankenberg et al. 2000	.	1941	R	1	6
.	40GR168	TN	Frankenberg et al. 2000	.	1941	R	1	6
.	40GR181	TN	Frankenberg et al. 2000	.	1941	R	1	6
.	40RE270	TN	.	.	1941	R	1	7
.	40HW106	TN	Frankenberg et al. 2000	.	1941	R	1	7
.	40GR98	TN	Frankenberg et al. 2000	.	1941	R	1	7
.	40HW140	TN	Frankenberg et al. 2000	.	1941	R	1	7
.	40HB60	TN	Frankenberg et al. 2000	.	1941	R	1	7

Table 4.1. (continued).

Site Name	Site No.	State	Reference	Initial Occupation	Terminal Occupation	Strategy	Cluster	Strategy Set
.	40LD318	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40LD302	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40LD295	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40LD278	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40LD275	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40LD269	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40HW100	TN	Frankenberg et al. 2000	.	1941	T	2	7
.	40GR88	TN	Frankenberg et al. 2000	.	1941	T	2	7
.	40GR90	TN	Frankenberg et al. 2000	.	1941	T	2	7
.	40GR113	TN	Frankenberg et al. 2000	.	1941	T	2	7
.	40GR162	TN	Frankenberg et al. 2000	.	1941	T	2	7
.	40HB80	TN	Frankenberg et al. 2000	.	1941	T	2	7
.	40HB83	TN	Frankenberg et al. 2000	.	1941	T	2	7
	40RH156	TN	Longmire 1996	1830	1920	T	3	7
.	40MG227	TN	.	.	1941	T	3	7
.	40RE216	TN	.	.	1941	T	3	7
.	40RE208	TN	.	.	1941	T	3	7
.	40RE253	TN	.	.	1941	T	3	7
.	40RH210	TN	.	.	1941	T	3	7

Table 4.1. (continued).

Site Name	Site No.	State	Reference	Initial Occupation	Terminal Occupation	Strategy	Cluster	Strategy Set
.	40HW120	TN	Frankenberg et al. 2000	.	1941	R	3	3
.	40RH199	TN	.	.	1941	T	1	7
	38BR629	SC	Crass and Brooks 1996	1890	1951	T	1	7
.	40MR577	TN	Frankenberg and Herrman 2000	.	1969	T	1	7
.	40LD303	TN	Frankenberg and Herrman 2000	.	1969	T	1	7
.	40LD271	TN	Frankenberg and Herrman 2000	.	1969	T	1	7
.	40GR86	TN	Frankenberg et al. 2000	.	1941	T	1	7
.	40GR87	TN	Frankenberg et al. 2000	.	1941	T	1	7
.	40GR89	TN	Frankenberg et al. 2000	.	1941	T	1	7
.	40GR10	TN	Frankenberg et al. 2000	.	1941	T	1	7
.	40GR107	TN	Frankenberg et al. 2000	.	1941	T	1	7
.	40GR156	TN	Frankenberg et al. 2000	.	1941	T	1	7
.	40GR176	TN	Frankenberg et al. 2000	.	1941	T	1	7
.	40HB101	TN		1936	1941	T	1	7
.	40MG246	TN	.	.	1941	T	2	7
.	40MG223	TN	.	.	1941	T	2	7
.	40MG226	TN	.	.	1941	T	2	7
.	40RH233	TN	.	.	1941	T	2	7

Table 4.1. (continued).

Site Name	Site No.	State	Reference	Initial Occupation	Terminal Occupation	Strategy	Cluster	Strategy Set
.	40RE217	TN	.	.	1941	T	2	7
.	40RE215	TN	.	.	1941	T	2	7
.	40RE282	TN	.	.	1941	T	2	7
.	40RE322	TN	.	.	1941	T	2	7
.	40RH204	TN	.	.	1941	T	2	7
.	40RE254	TN	.	.	1941	T	2	7
David Langley	1FR296	AL	Bastian 1988	1850	1976	T	2	7
Willie Floyd Farm	38BR619	SC	Crass and Brooks 1996	1890	1951	T	2	7
Tapscott-Epson	1MG774	AL	Hendryx 1998	1900	1958	T	2	7
.	40RE120	TN	Schroedl 1974	.	1940	T	2	7
.	40RE123	TN	Schroedl 1974	.	1940	T	2	7
.	40KN173	TN	Herrmann and Frankenberg 2000	.	1963	T	2	7
.	40MR676	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40MR681	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40MR615	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40MR560	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40LD338	TN	Frankenberg and Herrmann 2000	.	1969	T	2	7
.	40LD336	TN	Frankenberg and Herrmann 2000	1828	1969	T	2	7

Table 4.1. (continued).

Site Name	Site No.	State	Reference	Initial Occupation	Terminal Occupation	Strategy	Cluster	Strategy Set
.	40HB84	TN	Frankenberg et al. 2000	.	1941	R	1	7
Bowman House	40LD232	TN	Owens et al. 1997	1819	1969	R	2	2
.	40RE121	TN	Schroedl 1974	.	1940	R	2	3
.	40RE122	TN	Schroedl 1974	.	1940	R	2	3
.	40MR565	TN	Frankenberg and Herrman 2000	.	1969	R	2	3
.	40RH218	TN	Ahlman 1996	1870	1941	R	2	4
.	40RH211	TN	.	.	1941	R	2	4
Jimmy Massey	1FR293	AL	Bastian 1988	1870	1976	R	2	7
.	40KN156	TN	Herrmann and Frankenberg 2000	.	1963	R	2	7
.	40KN175/161	TN	Herrmann and Frankenberg 2000	.	1963	R	2	7
.	40MR559	TN	Frankenberg and Herrman 2000	.	1969	R	2	7
.	40MR550	TN	Frankenberg and Herrman 2000	.	1969	R	2	7
.	40HW109	TN	Frankenberg et al. 2000	.	1941	R	2	7
.	40RE392	TN	.	.	1941	R	2	8
.	40RE182	TN	Ahlman and Frankenberg 1996	1807	1941	R	2	8
.	40LD332	TN	Frankenberg and Herrman 2000	.	1969	R	2	8
Davis Site		IL	McCorvie 1987	1840	1865	R	3	1
Huggins Site		IL	McCorvie 1987	1828	1960	R	3	1

Table 4.1. (continued).

Site Name	Site No.	State	Reference	Initial Occupation	Terminal Occupation	Strategy	Cluster	Strategy Set
.	40RH202	TN	.	.	1941	T	3	7
.	40RE474	TN	.	.	1941	T	3	7
.	40MR593	TN	Frankenberg and Herrmann 2000	.	1969	T	3	7
.	40LD310	TN	Frankenberg and Herrmann 2000	.	1969	T	3	7
.	40LD296	TN	Frankenberg and Herrmann 2000	.	1969	T	3	7
.	99-101*	TN	Frankenberg and Herrmann 2000	.	1941	T	3	7
.	40HW191	TN	Frankenberg et al. 2000	.	1941	T	3	7
.	40GR153	TN	Frankenberg et al. 2000	.	1941	T	3	7
.	40MR607	TN	Frankenberg and Herrmann 2000	.	1969	T	4	3
.	40LD330	TN	Frankenberg and Herrmann 2000	.	1969	T	4	7
.	40RH200	TN	.	.	1941	T	4	7
.	40RE475	TN	.	.	1941	T	4	7
.	40RE309	TN	.	.	1941	T	4	7
.	40RE251	TN	.	.	1941	T	4	7
	40RE192	TN	Longmire 1996	1820	1840	T	4	7
	38BR522	SC	Crass and Brooks 1996	1890	1935	T	4	7
.	40MR632	TN	Frankenberg and Herrmann 2000	.	1969	T	4	7
.	40MR629	TN	Frankenberg and Herrmann 2000	.	1969	T	4	7
.	40MR576	TN	Frankenberg and Herrmann 2000	.	1969	T	4	7

Table 4.1. (continued).

Site Name	Site No.	State	Reference	Initial Occupation	Terminal Occupation	Strategy	Cluster	Strategy Set
.	40HB61	TN	Frankenberg et al. 2000	.	1941	T	4	7
.	40HB63	TN	Frankenberg et al. 2000	.	1941	T	4	7
.	40GR161	TN	Frankenberg et al. 2000	.	1941	T	4	7
.	40GR85	TN	Frankenberg et al. 2000	.	1941	T	4	7

* The Tennessee Division of Archaeology did not assign this resource a state site number.
T = Time Minimization
R = Resource Maximization

with occupations dating to the early and mid 19th century (see Table 4.1). Data on four East Tennessee farmsteads come from Schroedl's (1974) survey of historic archaeological sites in the Clinch River Breeder Reactor Program site in the Watts Bar Reservoir. These data are similar to that from the reservoir-wide surveys. The precise data collection procedures for the reservoir-wide surveys are given in the individual reports (Ahlman et al. 2000; Frankenberg and Herrmann 2000; Frankenberg et al. 2000; Herrmann and Frankenberg 2000). This generally included pedestrian survey of exposed shoreline and shovel testing of TVA property above the current cut bank. The archival data for these studies primarily were the TVA land acquisition maps. Ahlman's (1996) study of modernization at 41 farmsteads in the Watts Bar Reservoir area included more in-depth archival research than the reservoir inventory surveys by using TVA relocation files. The relocation files include data on farm size, tenure class, farmstead income, and crop production.

The other seven East Tennessee farmsteads in the sample are sites that have been more extensively investigated, both archivally and archaeologically, than the sites from the reservoir surveys and Ahlman's study. Four of these farmsteads, located in central East Tennessee (the Ramsey, Gibbs, and Tipton/Dixon houses and 40RE182), date from the late 18th and early 19th century through the early and mid 20th century. The Exchange Place, located in northeastern Tennessee near the Virginia border, dates from the early 19th century, and also served as a commercial venture along a prominent thoroughfare (Owens 1996, 1998). The Ramsey House (Avery et al. 1998; Faulkner 1995, 1996,1999, 2000;

Faulkner and Owens 1995), Gibbs house (Faulkner 1988, 1989, 1991; Groover 1998) and Exchange Place (Owens 1996, 1997, 1998) have been studied over the years by field schools and other projects aimed at understanding the landscape transformations that occurred at these sites. The Tipton/Dixon House site was examined by Phase II and Phase III archaeological investigations prior to construction on the site by private development (Ahlman 1998; Ahlman et al. 1999). Extensive archival research was undertaken for site 40RE182 as part of an archaeological survey of the Southwest Point Golf Course in Kingston, Tennessee (Ahlman and Frankenberg 1999). Limited shovel testing and beach survey of the site was undertaken as part of the reservoir-wide Watts Bar Reservoir survey (Ahlman et al. 2000). The final two sites are located near the Watts Bar Reservoir and were examined as part of a road widening project. One of these sites (40RH156) was occupied from approximately 1830 through the early 20th century (Longmire 1996; Longmire and Franklin, eds.1996; Franklin and McIlveena 1995b). The other site (40RE192) was occupied during the mid 19th century from approximately 1820 to 1840 (Longmire 1996; Longmire and Franklin , eds.1996; Franklin and McIlveena 1995a).

The other 14 farmsteads in the sample are from outside Tennessee and have been examined in various contexts. Three of these farmsteads are located in southern Illinois (Davis site, Huggins site, and Fair View Farm site). The Huggins and Fair View Farm sites have occupations dating from the mid 19th century through the 20th century (McCorvie 1987; McCorvie et al. 1989). The Davis site was occupied from 1840 to 1865 (McCorvie 1987). These sites were examined by data recovery programs that included archival research and extensive excavations.

Three farmsteads in the sample are located in the South Carolina Piedmont (38BR522, 38BR619, 38BR629), which is not commonly considered part of the Upland South but has many of the same ecological and social constraints acting on farm families throughout the latter region. These farmsteads all date from the late 19th to the mid 20th century, when the property was purchased by the federal government creating the Savannah River Site (Crass and Brooks 1996). The sites were investigated by test unit excavation and by extensive archival research, which was facilitated by the extensive records produced by the government when it acquired the property.

The final six farmsteads are located in the uplands of northern Alabama. Five of these sites were investigated prior to the creation of the Cedar Creek Reservoir in Franklin County by TVA (Bastian 1988). These sites have components dating to the late 19th century through 1976, when the land was acquired by TVA. The other site, also located in northern Alabama, has components dating to the early 19th century; however, the majority of the information concerning buildings at the site relates to its' 20th century occupation (Hendryx 1998).

Although the majority of the farmsteads in the analysis have components that date to the 20th century, which definitely gives a bias to that time period, there are numerous farmsteads that have components dating to the early and mid 19th century. The inclusion of farmsteads that have earlier components is meant to temper this bias toward later sites. The inclusion of these farms is also aimed at showing that there is continuity in the behavioral strategies undertaken by farm families in the sample.

Farmstead Statistical Analysis

The three statistical procedures listed previously, principal components analysis, cluster analysis, and correspondence analysis, were applied to the data set to identify and measure within group variation in the sample of 129 farmsteads. The principal component analysis was first applied to the categorical data. Fourteen principal components with non-zero eigenvalues were extracted from the data set. Table 4.2 provides a summary of the principal components with corresponding eigenvalues, individual proportions of variance, and cumulative proportion of variance. The first 10 principal components account for 88 percent of the overall variance and are used as variables for subsequent analyses. The eigenvectors for each principal component are provided in Table 4.3. The vectors for the first two principal components show that there is considerable loading on each of the variables with the greatest loading on hog house, shed, food storage features, silo, and agricultural processing features. These variables occur less frequently in the sample, which suggests that these variables may be the most sensitive to differences in the sample.

The cluster analysis of the first 10 extracted principal components derived a minimum of 49 clusters. This suggests two possibilities: there is a wide range of variation within the sample and the procedure is easily linking the clusters; or, there is very little variation within the sample and the procedure is having a difficult time creating

Table 4.2. Eigenvalues of the Correlation Matrix.

Principal Component	Eigenvalue	Difference	Proportion	Cumulative
1	2.77675	1.08695	0.198339	0.19834
2	1.68979	0.11745	0.120699	0.31904
3	1.57234	0.33110	0.112310	0.43135
4	1.24124	0.17545	0.088660	0.52001
5	1.06579	0.08612	0.076128	0.59614
6	0.97967	0.10126	0.069977	0.66611
7	0.87841	0.13364	0.062744	0.72886
8	0.74477	0.04996	0.053198	0.78205
9	0.69481	0.07843	0.049629	0.83168
10	0.61638	0.03294	0.044027	0.87571
11	0.58345	0.11473	0.041675	0.91739
12	0.46871	0.09606	0.033480	0.95087
13	0.37265	0.05743	0.026618	0.97748
14	0.31523	.	0.022516	1.00000

Table 4.3. Eigenvectors of the Principal Components.

Variable	Prin 1	Prin 2	Prin 3	Prin 4	Prin 5	Prin 6	Prin 7
Barn	0.255612	-.105925	0.370530	0.469953	0.022508	0.038154	0.173979
Crib	0.170017	-.317146	0.128761	0.334059	0.564834	0.044145	0.345622
Hog House	0.351212	0.031389	0.065851	-.498761	0.154594	0.055227	0.243658
Chicken House	0.289405	-.257907	0.106870	-.208175	-.157650	0.348213	-.269528
Shed	0.034738	0.381710	0.215719	0.238001	-.458074	0.264246	0.368632
Spring/Well House	0.066901	0.295810	0.511502	-.011281	0.315919	-.100613	-.338122
Smokehouse	0.303996	-.028857	0.069723	0.231338	-.185708	0.337383	-.495196
Wood Shed	0.244608	-.285955	0.017178	0.098907	-.111904	-.621856	-.299186
Food Storage	0.315416	0.316369	-.391157	0.159079	0.120739	0.030271	-.150456
Well/Cistern	0.274714	-.044128	-.338441	0.165380	-.264529	-.308869	0.227451
Privy	0.279066	-.408496	-.148208	-.201717	-.020391	0.311750	0.142049
Silo	0.326798	0.297219	0.228009	-.378797	0.371215	0.144525	-.078317
Agricultural Production	0.221964	0.370255	-.407208	0.132415	0.371215	0.144525	-.078317
Garage/Machine Shed	0.363076	0.102731	0.098633	0.031805	-.227174	-.173737	0.099815

Table 4.3. (continued).

Variable	Prin 8	Prin 9	Prin 10	Prin 11	Prin 12	Prin 13	Prin 14
Barn	-.062445	0.091282	0.081684	-.571843	-.330457	0.172192	0.219781
Crib	0.065607	0.029574	-.054616	0.265620	0.329234	-.282007	-.188279
Hog House	0.191475	-.211369	-.033531	-.294193	0.375236	0.470466	-.071371
Chicken House	-.329587	0.558858	0.207742	0.002962	0.299005	-.104048	0.108966
Shed	0.098152	-.142433	0.387698	0.294152	0.253061	0.013916	0.058096
Spring/Well House	0.054523	0.193052	0.045707	0.426095	-.186246	0.396780	-.092427
Smokehouse	0.434790	-.262908	-.410844	-.014567	0.100754	-.126520	-.026728
Wood Shed	0.028529	-.306105	0.426474	0.072102	0.210846	-.010325	0.182863
Food Storage	0.021100	0.091658	0.390555	-.200672	-.109685	-.067796	-.604736
Well/Cistern	0.308482	0.518465	-.273151	0.214317	-.015755	0.271367	0.072004
Privy	0.046567	-.241144	0.207554	0.359597	-.576143	0.097908	0.024156
Silo	0.226962	0.109491	-.021620	-.044880	-.222585	-.627495	0.171838
Agricultural Production	-.223550	-.111917	-.019614	0.096047	0.065378	0.050127	0.621749
Garage/Machine Shed	-.666931	-.231399	-.414589	0.135569	-.028717	-.007900	-.256191

clusters. The latter reason is most likely and it seems that the procedure created a multitude of clusters based on a distinctive combination of variables. Thus, the procedure is demonstrating that there are 49 different combinations of variables within the data set.

The FAST CLUS procedure, which was set to extract eight clusters using the first 10 principal components, derived clusters that appear to be more amenable to discerning differences among the farmstead sample. Initial iterations using this procedure on the original set of 25 variables revealed heavy loading on variables with low frequencies. This is what led to the concatenation of some of the less frequently occurring variables and the removal of some variables discussed previously. Subsequent iterations were undertaken with revised data sets until it appeared that the principal components, and therefore the clusters, were not loading on these infrequently occurring variables.

The eight derived clusters ranged in frequency from one to 88 (Table 4.4). A plot of the clusters is provided in Figure 4.1, which graphically represents the relative closeness of the majority of the clusters. As Table 4.4 indicates, the largest proportion of the sites are included in Cluster 7 (N = 88) and the smallest occur in Cluster 5 (N = 1). The plot (Figure 4.1) demonstrates that clusters 3, 4, 6, and 7 are the most closely related and tend to cluster in a linear pattern. Based on the distance scores (Table 4.4), the centroids for cluster 4 and 6 are the closest and the centroids for clusters 1 and 2 are the farthest apart. Cluster 2, however, is the nearest cluster to Cluster 1. Based on the plot and the cluster summary Cluster 1 falls out as an outlier relative to the other clusters. The cluster assignment for each site is provided in Table 4.1.

Table 4.4. Summary of Cluster Analysis.

Cluster	Frequency	Nearest Cluster	Distance Between Cluster Centroids
1	5	4	5.5412
2	4	6	5.8331
3	11	7	3.2309
4	5	6	2.8115
5	1	2	6.1534
6	12	4	2.8115
7	88	3	3.2309
8	3	6	3.3172

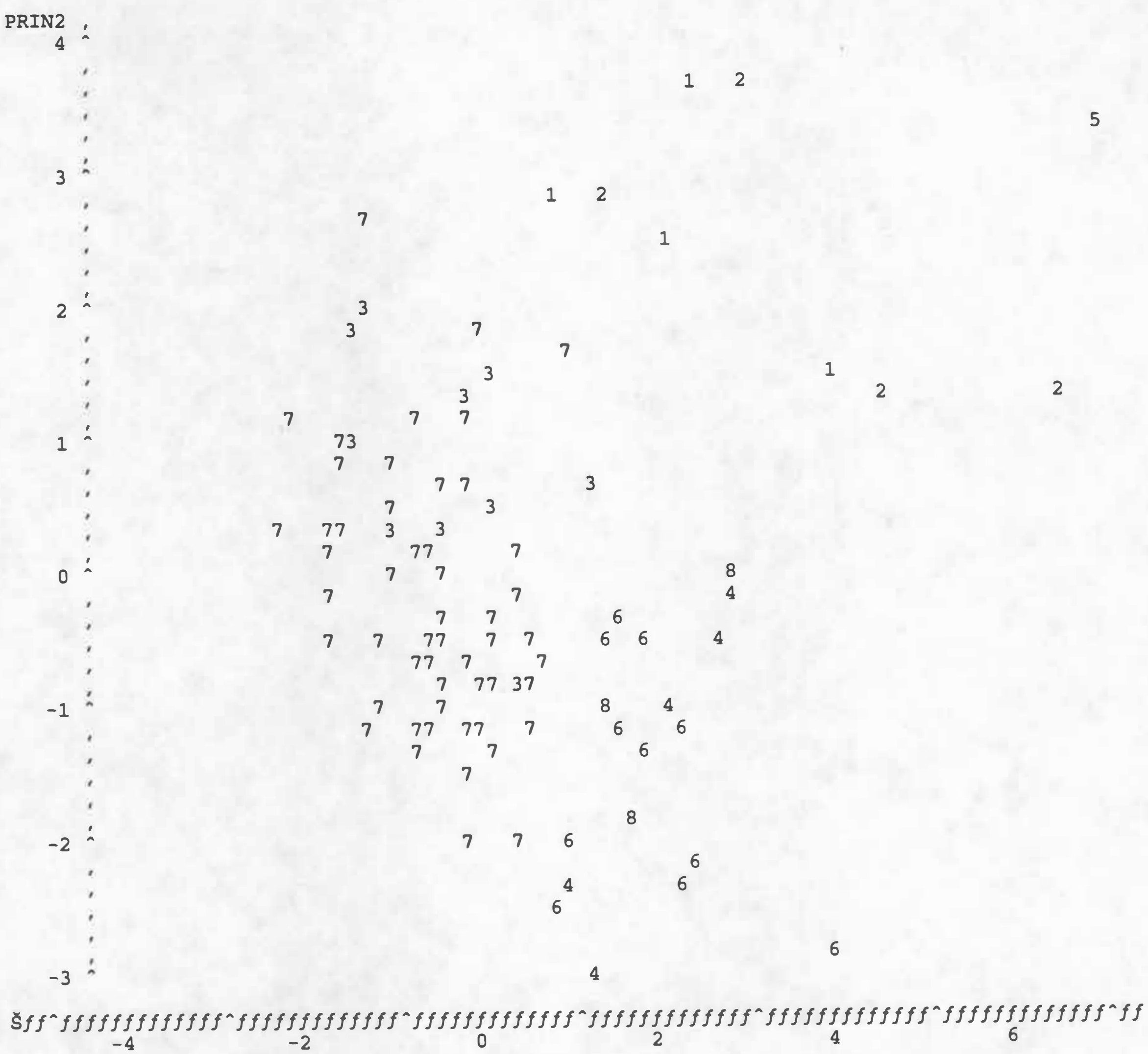

Figure 4.1. Cluster Analysis Plot.

The correspondence analysis on the variables from 126 farmsteads appears to provide the same information as that derived from the principal components and cluster analysis. Three farmsteads were removed from the procedure because they did not have any occurrence of variables due to the removal of the dwelling variable from the analysis. The correspondence analysis plot depicts a tight cluster of farmsteads with a few outliers that fall away from the central core (Figure 4.2). This plot is practically identical to the cluster analysis plot, confirming that there is a correspondence in the occurrence of variables within the farmstead sample. The correspondence analysis plot of the variable correspondence indicates similarities and differences among the variables (Figure 4.3). There is a central core of variables clustered in the center of the plot that is primarily formed by the most frequently occurring variables. This suggests that the occurrence of these variables corresponds to the occurrence of the other variables. There are three variables that can be considered outliers relative to the remainder of the plot, suggesting the occurrence of these variables does not correspond to the occurrence of the other variables in the analysis. These variables, spring house/well house, agricultural processing features, and food storage features, are low occurring variables but do not comprise the three lowest occurring features. The food storage and agricultural processing variables were also variables that were loaded on by the principal components analysis.

The statistical procedures used in this analysis on 14 variables from 129 Upland South farmsteads intended to identify and measure wide range of within group variation. The analysis demonstrated that there is not a wide range of variation within the sample. The majority of the variation appears to correlate with the occurrence of a few variables.

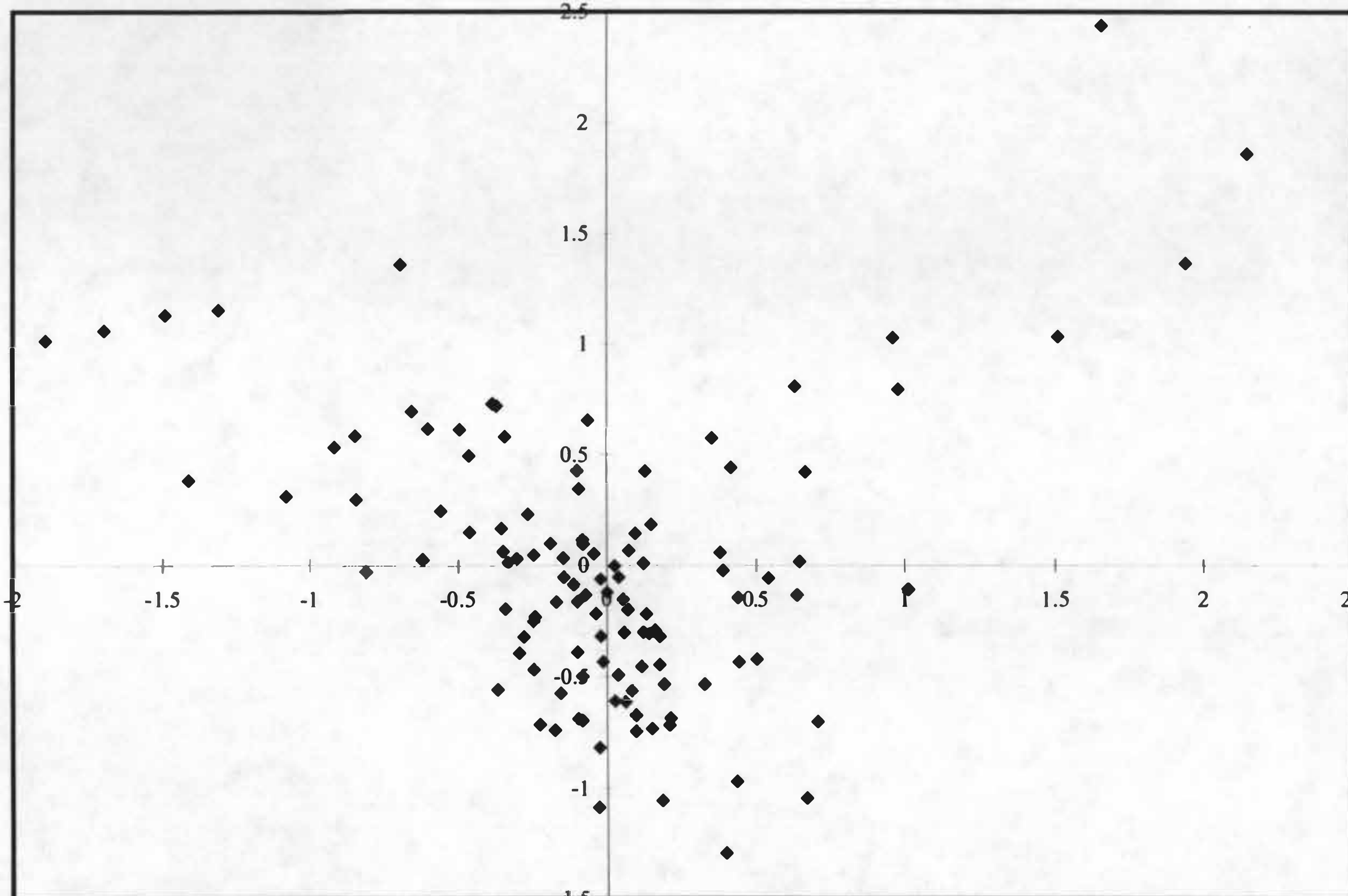

Figure 4.2. Plot of Farmsteads based on Correspondence Analysis Results.

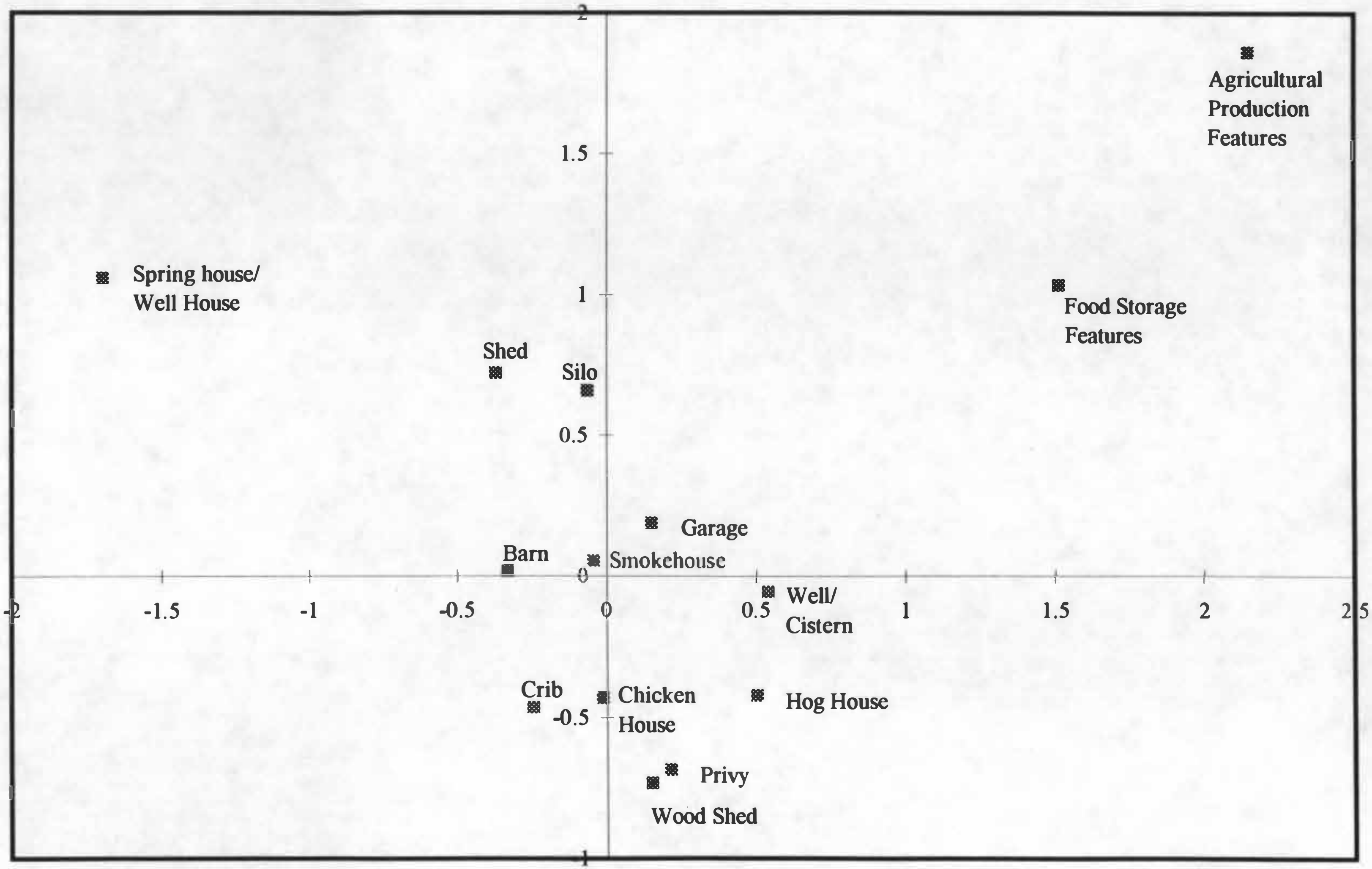

Figure 4.3. Plot of Variables based on Correspondence Analysis Results.

This small range of variation made allocation of each farmstead into a cluster difficult. As will be shown below, several of the clusters are defined by the occurrence of these low frequency variables.

Farmstead Cluster Characteristics

The cluster analysis procedure derived eight clusters from the data set that apparently represent continuities in variable occurrence. The cluster into which each farmstead was placed by the cluster analysis procedure is listed in Table 4.1. Each cluster is composed of a group of farmsteads characterized by a set of variables the procedure used to classify the cluster. Most of the clusters have a set of variables occurring at each farmstead, which sets them apart from the other clusters. This defining set of variables are the "primary variables." The "secondary variables" occur at the majority (75 percent or more) of the farmsteads in the cluster. There is a third set of variables that occur at approximately 50 percent of the farmsteads but are not necessarily defining characteristics and are likely to occur as primary or secondary variables in another cluster. The primary and secondary variables for each cluster are listed in Table 4.5.

The variables characteristic of the clusters are important to the assignment of each farmstead into the different strategies. Although the cluster analysis procedure was expected to provide results that group the farmsteads into clusters correlated with a specific strategy, it seems the procedure better determined whether the farmstead's occupants had undertaken a resource maximization or time minimization

Table 4.5. Characteristics of Clusters Derived During the Cluster Analysis.

Cluster No.	No. in Cluster	Primary Variables	Secondary Variables	Variable Occurrence	Strategy
1	5	smoke house, food storage features, well/cistern, agricultural processing features	barn, undifferentiated shed	4-6	RM
2	4	barn, undifferentiated shed, silo	hog house, smoke house, well/cistern, garage	8-9	TM
3	11	spring house/well house	barn	4-5	RM (N=10)/ TM (N=1)
4	5	barn, chicken house, well/cistern, privy	smoke house, food storage features, wood shed	5-6	RM
5	1	all but wood shed, undifferentiated shed		12	RM
6	12	barn, smoke house	well/cistern, privy	7-8	RM
7	88	none	barn, smoke house, undifferentiated shed, chicken house	<5-6	RM (N=12)/ TM (N=76)
8	3	barn, crib, chicken house, privy	hog house, smoke house, garage	7	RM

RM = resource maximization
TM = time minimization

strategy. The following is a brief discussion of each cluster's characteristics, the geographical location of the farms in the cluster, and how this cluster relates to either resource maximization or time minimization. Additionally, the specific strategy undertaken by the individual farmstead's occupants will also be determined and discussed.

Cluster 1

Cluster 1 is comprised of five farmsteads that have four variables in common: smoke house, food storage features, well/cistern, and agricultural processing features. The secondary variables are barns and sheds, which occur at three of the farms. The typical farmstead in this cluster has four or six variable occurrences. Geographically, three farms are located in East Tennessee and two are located in southern Illinois. The East Tennessee farmsteads in the cluster have the highest variable occurrence rate and the variables are comprised of a relatively equal number of agricultural and food production structures. The southern Illinois farmsteads have the lowest overall variable occurrence rate in the clusters and are comprised primarily of food production features.

The families that occupied the farmsteads in this cluster are classified as resource maximizers because of the relatively high occurrence of variables relating to agricultural and food production at each farmstead. Although all the farmsteads are considered resource maximizers, there is a difference in the specific strategies undertaken by each farm family. The East Tennessee farm families appear to have undertaken a resource maximization strategy including both agricultural and food production; therefore, they undertook resource maximization Strategy 1 (see Table 3.3). The southern Illinois farm families appear to have concentrated their efforts at food production strategies; therefore, they adopted resource maximization Strategy 3. Two of the Tennessee and one of the Illinois farmsteads were occupied for a long period of time which further suggests that these were long-term strategies.

Cluster 2

Cluster 2 is composed of four East Tennessee farmsteads characterized by barns, sheds, and silos. The secondary variables, which variously occur at three of the farmsteads, are hog house, smoke house, well/cistern, and garage/machinery shed. Each farmstead in this cluster tends to have about eight or nine variable occurrences. The four farmsteads in this cluster comprise four of the five farmsteads where silos occur. Although the main characteristics of this cluster are agriculturally related structures, most of the farmsteads also have food production structures.

The families that occupied the farmsteads in this cluster are also classified as resource maximizers because of the relatively high occurrence of variables at each farmstead. Three of the farmsteads have relatively equal numbers of agricultural and food production features indicating these families undertook resource maximization Strategy 1. The other farmstead had few food production features, which implies that there was a focus on agricultural production, and the families that occupied this farm are considered to have undertaken resource maximization Strategy 2.

Cluster 3

This cluster is comprised of seven East Tennessee and three northern Alabama farmsteads. The primary variable of this cluster is the occurrence of the spring house/well house variable. These 11 farmsteads make up 78.5 percent of the farmsteads where spring houses/well houses occur. The secondary variable of this cluster is the occurrence of a barn. There are several other variables that occur frequently: crib, chicken house, shed, and smoke house. The typical farmstead in this cluster has four or five variable occurrences. One farmstead (40MR607) only has two variable occurrences, but probably is included in this cluster because there was a spring house/well house as well as a relatively low variable occurrence rate.

The majority of the farmsteads (N = 10) in this cluster have a relatively high occurrence of variables; therefore, the families that occupied these farms are considered resource maximizers. Six farms had relatively equal numbers of agricultural and food production features, suggesting the families that lived on these farms undertook resource maximization Strategy 1. The farms in this strategy include the three Alabama farmsteads in this cluster. Three farms had more agricultural production than food production features. The families that occupied these farms undertook resource maximization Strategy 2. One farm had more food production features than agricultural production features, which suggests the families that occupied this farm undertook resource maximization Strategy 3. The families that occupied the other farmstead (40MR607), which has a relatively low variable occurrence rate, are considered time minimizers.

Because there are few buildings at this farm, the families are considered to have undertaken time minimization Strategy 4.

Cluster 4

Cluster 4 is composed of four East Tennessee farmsteads and one southern Illinois farmstead. The primary variables for this cluster are barn, chicken house, well/cistern, and privy. The secondary variables are smokehouse, food storage features, and wood shed. The typical farmstead in this cluster has five or six variable occurrences. Although there is a predominance of agricultural production structures and features within the defining variables of this cluster, food production structures and features also occur relatively often.

All five farms have relatively high variable occurrence rates, which means the families that occupied these farms had undertaken a resource maximization strategy. Three farms, including the southern Illinois farmstead, had relatively equal numbers of agricultural and food production features; therefore, the farm families that occupied these farms are considered to have undertaken resource maximization Strategy 1. The other two farms have a higher number of agricultural production than food production features; therefore, these families are presumed to have undertaken resource maximization Strategy 2.

Cluster 5

This cluster is composed of only one farmstead, the Tipton/Dixon House site (40LD179). This East Tennessee farmstead is the one consistent outlier among all the statistical analyses. What sets it apart from all the other farmsteads is that all the variables except wood shed and undifferentiated shed occur at this farmstead. Because of the high rate of variable occurrence and the relatively equal number of agricultural and food production features, the families that occupied this farmstead are considered to have undertaken resource maximization Strategy 1. This farmstead is an outlier and there is an abundance of data concerning its occupation through time; therefore, it will be discussed at length in the next chapter.

Cluster 6

This cluster is comprised of 12 East Tennessee farmsteads that are characterized by the occurrence of a barn and smoke house. The secondary variables are well/cistern and privy. The other commonly occurring variables are crib, chicken house, and garage/machine shed. The typical farmstead in this cluster has an occurrence of seven or eight variables. Because of the relatively high occurrence of variables and equal occurrence of agricultural and food production variables, the families that occupied the farmsteads in this cluster are all considered to have undertaken resource maximization Strategy 1.

Cluster 7

Cluster 7 is the largest cluster and includes 88 farmsteads from East Tennessee, northern Alabama, and South Carolina. These farmsteads are typically characterized by five or six variables or less, but the occurrence of four variables is more common for this cluster. The variables that seem to be characteristic of this cluster are barn, smoke house, chicken house, and undifferentiated shed. It is difficult to characterize these farmsteads as being dominated by either agricultural or food production structures and features because of the relative abundance of farmsteads in the cluster and fairly random occurrence of variables in the cluster. This cluster seems to be a catch-all cluster for the farmsteads that did not have variables similar to the ones that defined the other clusters.

Twelve of the farmsteads in the cluster have a variable occurrence rate that is on par with farmsteads in the other clusters categorized as resource maximizers; therefore, the families that occupied these farms are considered to be resource maximizers. Six of the farmsteads have a relatively equal occurrence of agricultural and food production features, which implies the families that lived on these farms undertook resource maximization Strategy 1. All of the farmsteads considered to have undertaken this strategy in this cluster are located in East Tennessee. The other six farmsteads have a higher occurrence of agricultural production features; therefore, the families that occupied these farms are considered to have undertaken resource maximization Strategy 2. Five of these farms are located in Tennessee, and the other is located in northern Alabama.

The other 76 farmsteads in this cluster have a low variable occurrence rate and the families that occupied these farmsteads are classified as time minimizers. There are 13 farmsteads with a relatively equal occurrence of agricultural and food production features; therefore, the families that occupied these farms are considered to have undertaken time minimization Strategy 1. Another 14 farmsteads have a relatively higher occurrence of food production features. The families that lived on these farmsteads are considered to have undertaken time minimization Strategy 3.

The largest group within this cluster are the 35 farmsteads that have a relatively higher occurrence of agricultural production features than food production features. The families that lived on this group of farmsteads are considered to have engaged in time minimization Strategy 2. All but three of these farmsteads are located in East Tennessee. The other three farms include two in Alabama and one in South Carolina. In general, few or no food production features were identified at these farmsteads.

There are 14 farmsteads that have few, if any, outbuildings or features. The families that occupied these farms are considered to have undertaken time minimization Strategy 4. Most of these farms (N =9) have only one variable occurrence, two have two variable occurrences, and three farmsteads have no variable occurrences. Of these farmsteads, all but one, which is located in South Carolina, are located in East Tennessee.

One East Tennessee farmstead (40RE192) dates from 1820-1840, which is the earliest farmstead classified into this strategy. Longmire (1996) concluded that this farmstead may have been occupied by a Cherokee family rather than an Euro-American family because of similarities in the artifact assemblage to historic Cherokee assemblages. Longmire also noted that wild game occurred in the faunal assemblage and that there were numerous tea sets. According to the model in this study, the family(ies) that occupied this farmstead had undertaken a strategy that focused on activities other than agricultural and food production. The occurrence of these artifacts, according to this model, implies the family was undertaking a strategy that included leisure and hunting activities, which concurs as well as disagrees with the model. Hunting at this site is obviously a food procurement activity. During the time period that 40RE192 was occupied, however, this activity probably occurred at the majority of Upland South farmsteads to acquire food stuffs to supplement the diet, and probably served to provide needed food for growth and development and not a surplus for commercial sale. The fact that numerous outbuildings associated with agricultural and food production did not appear on the farm within a 20 year period suggests that this activity, although it was a food procurement behavior, was undertaken as a time minimization strategy rather than a resource maximization strategy. Because this site was occupied for a relatively short time period, it is suggested here that this strategy was not beneficial to the fitness of the family that occupied the site.

Cluster 8

This cluster is composed of three East Tennessee farmsteads characterized by the occurrence of the barn, crib, chicken house, and privy variables. The secondary variables, hog house, smoke house, and garage, also occur frequently. The typical farmstead in this cluster is composed of seven variable occurrences. There appears to be a greater occurrence of agricultural production structures and features within this cluster relative to the occurrence of food production structures and features. The families that occupied these farmsteads are believed to have been engaged in resource maximization Strategy 2.

Clustering Results

The statistical grouping of the 129 farmsteads into eight different clusters assisted in the assignment of these farmsteads into either the resource maximization or time minimization strategy sets. It was hoped that the cluster analysis would neatly place the 129 farmsteads into the eight categories, which would be indicative of the eight different strategies in the model. The derived clusters, however, were not so clear cut, as shown in the preceding section. The statistical clustering derived farmstead group clusters that generally included both resource maximizers and time minimizers. The resource maximizers were grouped in clusters 1 through 6 and 8. Some resource maximization farmsteads were placed into Cluster 7, which generally included the time minimizers. One farmstead placed into Cluster 3 was classified as a time minimizer. Based on the allocation of the different farmsteads into the different strategies, the statistical clustering was accurate in determining the difference between resource maximizers and time minimizers 90 percent of the time.

A second cluster analysis was conducted on the data set to derive only two clusters. This procedure derived a cluster that included nine farms and a cluster that included 120 farms. The smaller cluster was comprised of farmsteads characterized as being occupied by families that had undertaken a resource maximization strategy. The primary variables of the cluster were barn, well/cistern, and garage/machine shed and these farmsteads were the only ones in which this combination occurred. The secondary variables were smokehouse, undifferentiated shed, and chicken house. The other 120 farmsteads includes various combinations of variables. This further demonstrates that there is a small range of within-group variation.

Strategy Set Composition

As shown in the preceding section, the cluster analysis did not derive clusters that were indicative of each strategy in the model. This analysis was better suited at deriving many clusters that could then be examined individually for classification into the individual strategies, listed in tables 3.3 and 3.4. The number of sites that were classified into the different strategy sets is listed in Table 4.5. This section provides a more in-depth analysis of the composition of the different strategy groups.

Resource Maximization Strategy 1

Under this strategy, farm families focus their time, energy, and resources toward both agricultural and food production. The occupants of 34 farmsteads were classified into this strategy group because there was a relatively high occurrence rate of the variables at each site and there was a relatively equal number of agricultural and food production features. This group includes farmsteads from seven of the eight clusters. The farmsteads classified into Cluster 8 are not included in this group. The majority (N = 30) of the farmsteads in this group are located in East Tennessee. There are three farms located in Alabama and one located in southern Illinois included in this group. The farmsteads range in time from the late 18th century through the mid 20th century. Most of the farmsteads, however, appear to date from the late 19th through the mid 20th century.

The variable occurrence rate in this group ranges from 4 to 12; however, the typical farmstead has around 6 or 7 variables. Based on total number of buildings, the group ranges from 5 to 16 buildings per farm. The average number of buildings per farm is 10. The primary variables of this group are barn and smokehouse, and the secondary variables are chicken house, undifferentiated shed, well/cistern, and privy. This group also includes most of the farms that have a hog house and food storage features.

Relative to the other farms in the sample, these farmsteads fulfill the requirements of resource maximization Strategy 1. There is a high occurrence of both agricultural and food production structures and features as well as a relatively high diversity among the farms as to the types of structures and features that are present.

Resource Maximization Strategy 2

Under this strategy, farm families focus their time, energy, and resources at agricultural production rather than food production. The occupants of 15 farmsteads classified into this group came from five different clusters. All of the farms in this group but one, which is located in Alabama, are located in East Tennessee. Two farmsteads in this group were occupied from the early 19th century through the mid-20th century; however, the majority appear to have been occupied from the late 19th century through the mid-20th century. The farmsteads in this group typically have six or seven variable occurrences and average eight buildings per farm. The primary variable for this group is the barn with the secondary variables including crib, chicken house, and undifferentiated shed. Eight of the farms had more than one shed.

The farmsteads in this group fulfill the requirements of the strategy because there is a relatively high occurrence of agricultural production variables at each farmstead. There is a low diversity of types among the farms as most of them consist of the four primary and secondary variables. Almost all of the farms have a spring house/well house or well/cistern, which could be a water source for both the house as well as for agricultural production.

Resource Maximization Strategy 3

Under this strategy farm families focus their time, energy, and resources on food production rather than agricultural production. This strategy group includes the occupants of two southern Illinois farmsteads and one East Tennessee farmstead. The farmsteads in this group are from two different clusters. The two southern Illinois farms date to the first half of the 19^{th} century. One was in operation to 1865 and the other was in operation until the early 20^{th} century. The East Tennessee farmstead was apparently occupied from the late 19^{th} through early 20^{th} century.

The farms in the group are characterized by three or four variable occurrences with an average of nine structures or features per farm. These structures were primarily related to food production and include smokehouse, food storage features, well/cistern, and spring/well house. The two southern Illinois farmsteads had sorghum furnaces (agricultural production features) that were probably aimed at commercial production rather than household production. No barns, cribs, or hog houses were identified at any of these sites. These farms fulfill the requirements of this strategy by a relatively high variable occurrence rate of food production structures and features. In addition, there is little relative diversity among the farms concerning the types of structures and features that were present.

Resource Maximization Strategy 4

Under this strategy farm families focus their time, energy, and resources on activities other than agricultural and food production. No farmsteads met the criteria for placement into this group.

Time Minimization Strategy 1

Under this strategy farm families focus their time, energy, and resources on other activities with a minimal investment, relative to resource maximizers, in agricultural and food production. The occupants of 13 farmsteads were classified into this strategy group. All of the farmsteads in this group were classified into cluster 7 by the statistical analysis. All but one of the farmsteads, which is located in South Carolina, are located in East Tennessee. All but one of these farmsteads was occupied from the late 19th century through the early 20th century. One farm (40HB101) was occupied from 1936 through 1941. The occupants of this farm had moved from one reservoir area to the Cherokee Reservoir area, and were displaced when the Cherokee Dam was constructed. The typical farm in this group had four variable occurrences, and had an average of five structures or features. The primary variables are barn and smoke house and the secondary variables are chicken house and privy.

The farmstead occupants of this group fulfill the requirements of this strategy because there is a low occurrence of variables relative to those families that had undertaken a resource maximization Strategy 1. In addition, there is a low diversity of structure and feature types among the farmsteads in this group as only eight different variables occur among these farms.

Time Minimization Strategy 2

Under this strategy farm families focus time, energy, and resources on activities other than agricultural and food production; however, there is a greater minimal investment in agricultural production than food production. This strategy consists of the largest group of farmsteads (N = 33). All of the farmsteads in this group were classified into Cluster 7 by statistical analysis. There are two farmsteads in this group located in Alabama and one located in South Carolina. All of the other farmsteads in this group are located in East Tennessee. The farmsteads in this group had between one and five variable occurrences. The typical farm had three variable occurrences and an average of three structures or features. The primary variable of this group was the barn and the secondary variables were the chicken house and undifferentiated shed. Approximately one-quarter of the farms had a crib, well/cistern, or privy. The families in this group fulfill the requirements of the strategy because there is a relatively low occurrence of the variables and there is a low diversity in the variables that are present.

Time Minimization Strategy 3

Under this strategy farm families focus time, energy, and resources at activities other than agricultural and food production; however, there is a greater minimal investment in food production than agricultural production. The 14 farmstead occupants in this strategy group were all classified into Cluster 7 by statistical analysis. All of the farmsteads in this group are located in East Tennessee. The typical farm in this group had three variable occurrences and an average of three structures or features per farm. The primary variable in this group, which occurs on 10 farms, is the smoke house. The secondary variables are chicken house and privy. Only seven different variables occur among the farmsteads. The families in this group fulfill the requirements of the strategy because there is a relatively low occurrence of variables and diversity among the farmsteads.

Time Minimization Strategy 4

Under this strategy farm families focus their time, energy, and resources at activities other than agricultural and food production. There is almost no investment in agricultural or food production. The occupants of 15 farmsteads are included in this strategy group. The majority of the farmsteads (N = 14) were classified into Cluster 7 by the statistical analysis. The other farmstead was classified as Cluster 3. One farmstead in this group is located in South Carolina, the rest are located in East Tennessee. The typical farmstead in this group has only has one or two variable occurrences

Discussion

A sample of Upland South farms was studied to identify and measure variation in the occurrence of different structures and features among farmsteads in the region. It was hoped the principal components, cluster, and correspondence analysis procedures used in this study would indicate where the variation among the farmsteads exists. Through the identification of this variance among the sampled farmsteads, there should be an indication about which strategy, listed above in Chapter 3, the farm occupants had undertaken.

The statistical analyses indicated that the greatest amount of variation is in the occurrence of low frequency variables, such as hog house, food storage features, agricultural processing features, spring house/well house, and silo. The principal components analysis tended to load on these variables and the cluster analysis derived three clusters with these features and structures among the primary variables. The correspondence analysis further showed that the occurrence of spring houses/well houses, food storage features, and agricultural processing features did not correlate with the other variables in the data set. The cluster analysis was more proficient at determining whether the farmstead's occupants were better characterized as resource maximizers or time minimizers rather than at identifying specific strategy choices.

The allocation of individual farmsteads in the different strategies first involved determining whether the farmstead fell into the resource maximization or time minimization categories. In general, those farmsteads in Cluster 7 were time minimizers and those in the other seven were resource maximizers. As noted above, based on an *ad hoc* analysis of the clusters, this procedure was probably accurate for 90 percent of the sample. From this allocation, the individual farms were further placed into the different strategies. The primary and secondary characteristics and rate of occurrence of the variables were noted for each cluster, which is listed in Table 4.4. The final grouping and farmstead allocation are listed in Table 4.6.

This analysis demonstrates that the hypothesized wide range of variation among the farmsteads is not supported by the data; there is little variation in the occurrence and type of features and structures among Upland South farmsteads. This general lack of variation made the allocation of the individual farmsteads into different clusters difficult. The identified variation primarily relates to the occurrence of a few low frequency variables.

Two questions arise from this analysis. Is the continuity in strategies undertaken by the occupants of a farmstead, presumed by the analysis, a realistic assumption? To address this question, an in depth analysis of the well documented Tipton/Dixon House site is undertaken in the next chapter. This study will show that through several changes in the site's occupants the same resource maximization strategy was undertaken. Second, why is there such little variation among the farmsteads? The simple response to this question is that the physical environment of the Upland South limited the strategies available for the families to select. The similarities in the strategies ultimately meant that people would be undertaking the same activities and behavior; therefore, there would be similarities in the type and occurrence of structures within the region.

Table 4.6. Final Grouping and Allocation of Farmsteads in the Different Strategies.

Resource Maximization					**Time Minimization**				
Strategy 1		***Strategy 2***	***Strategy 3***	***Strategy 4***	***Strategy 1***	***Strategy 2***		***Strategy 3***	***Strategy 4***
40MG230	40GR181	40LD232	Davis Site	NONE	40RH199	40MG246	40HW100	40RH156	40MR607
40RH208	40RE270	40RE121	Huggins		38BR629	40MG223	40GR88	40MG227	40LD330
40KN120	40HW106	40RE122	Site		40MR577	40MG226	40GR90	40RE216	40RH200
40RE261	40GR98	40MR565	40HW120		40LD303	40RH233	40GR113	40RE208	40RE475
40RH216/	40HW140	40RH218			40LD271	40RE217	40GR162	40RE253	40RE108
217	40HB60	40RH211			40GR86	40RE215	40HB80	40RH210	40RE251
40MR619	40HB84	1FR293			40GR87	40RE282	40HB83	40RH202	40RE192
Exchange	40RE277	40KN156			40GR89	40RE322	40LD302	40RE474	38BR522
Place	40RE445	40KN175/			40GR10	40RH204	40LD295	40MR593	40MR632
1FR297	40HW123	161			40GR107	40RE254	40LD278	40LD310	40MR629
1FR295	40HB46	40MR559			40GR156	1FR296	40LD275	40LD296	40MR576
1FR292	40GR168	40MR550			40GR176	38BR619	40LD269	99-101	40GR85
Gibbs		40HW109			40HB101	1MG774	40HW100	40HW191	40HB61
House		40RE392				40RE120		40GR153	40HB63
40LD326		40RE182				40RE123			40GR161
40MG225		40LD332				40KN173			
40RE212						40MR676			
11SA336						40MR681			
40LD179						40MR615			
40MG224						40MR560			
40MG271						40LD338			
40RH206						40LD336			
40MR669						40LD318			
40MG241									
40RE489									

CHAPTER 5

INDIVIDUAL FARMSTEAD PERSPECTIVE:

STRATEGY CONTINUITY AT THE TIPTON/DIXON HOUSE SITE

As the population analysis has demonstrated, there is a small degree of variation among the Upland South farmsteads in the sample. This variation is assumed to reflect the undertaking of different strategies by the families that occupied these farms. The formulation of the data set creates static entities where it is assumed that the same strategy was undertaken by families occupying a farm during its entire existence. This assumption is fallible because strategies can change due to social and/or ecological changes.

The Tipton/Dixon House site is an excellent example to examine the continuity of a strategy undertaken by a series of families at a single farm. This well-documented, East Tennessee farmstead was occupied continuously from 1820 to 1969, when it was purchased by the Tennessee Valley Authority. The following is a discussion of the historical context and archaeological investigations undertaken at the site and an in-depth analysis of the continuity in the resource maximization strategy undertaken by the families that occupied this site.

The Tipton/Dixon House Site

The Tipton/Dixon House site is a multicomponent site located on an older alluvial terrace of the Little Tennessee River in Loudon County, Tennessee (Figure 5.1). The site

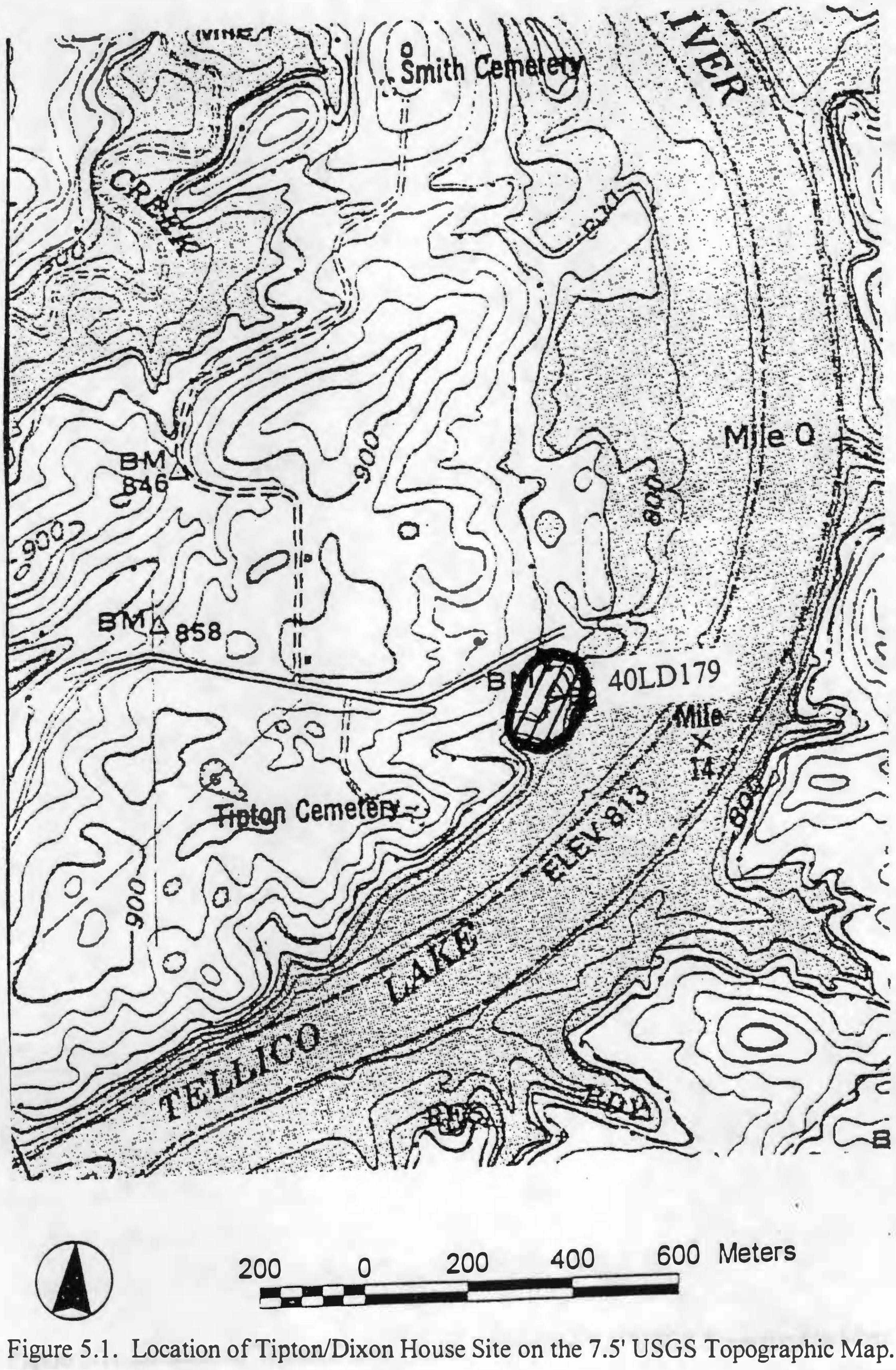

Figure 5.1. Location of Tipton/Dixon House Site on the 7.5' USGS Topographic Map.

is on property purchased by TVA for the construction of the Tellico Reservoir in 1969. The site was first identified in the late 1970s during an archaeological survey of historical properties in the "Tellico Industrial Park II" (Carnes 1980).

Phase II investigations of the site were undertaken in December 1997 by the University of Tennessee, Department of Anthropology prior to the development of the site area by Rarity Bay on Lake Tellico (Ahlman 1998). Testing involved the systematic stripping of the site at 10 m intervals by a backhoe and the placement of opportunistic test units. During these investigations, features and artifacts were encountered suggesting a Late Archaic to Late Woodland occupation and numerous features and structural remains were found associated with the historic occupation.

Based on the Phase II findings, Phase III mitigation of the site was conducted between October and December, 1998. The goals of this research were to learn more about the Late Woodland prehistoric occupation of the site; to provide information about the historic yard layout to understand the activities that were performed there and learn more about the human behaviors that created them; to understand the construction sequence of the historic dwellings on the property; and to gain further information concerning enslaved African-Americans in an Upland South frontier and farmstead setting (Ahlman et al. 1999:19-23).

Historical Context of the Tipton/Dixon House Site

The following discussion of the history relating to the Tipton/Dixon House is taken from the Phase II and III reports of the archaeological investigations at the site (Ahlman

1998; Ahlman et al. 1999). It is not currently known when the first Euro-American occupation of the Tipton/Dixon House site occurred. It is suspected that the initial historic occupation of the site occurred in 1819 when William Dixon either purchased or was granted the land after the Cherokee ceded it. Dixon was prominent in Monroe County politics and his house was the location for the first Monroe County Circuit Court in May, 1820. Court was only held there once as Dixon apparently became ill and court was held elsewhere during subsequent sessions. William Dixon apparently died shortly thereafter and left all his land and money to his wife. Dixon was a slave holder and in his will he granted his five African-American slaves their freedom following his wife's death (Monroe County Will Book A). There was prolonged litigation concerning the freedom of the slaves, and the case continued into the late 19th century (Lynn McConkey 1999, personal communication).

Sometime between 1820 and 1822, David Taylor acquired the property. The Monroe County courthouse and its records burned in 1832, so it is unknown how Taylor became the property owner. Re-filed records indicate that in 1822 John B. Tipton purchased 640 acres from Taylor that probably contained the house site (Monroe County Deed A/36). John B. Tipton was born in Washington County, Tennessee in 1797 and moved to Monroe County in 1819. He served as Monroe County Circuit Court Clerk in 1820 and was present in William Dixon's house when court was held there. In addition to serving as Circuit Court Clerk, Tipton was also a surveyor and planter who held some very large tracts of land. According to federal agricultural censuses he is listed as owning 11,200 acres in 1850 (USAC 1850), and 13,230 acres in 1860 (USAC 1860). The majority of this land was listed as unimproved mountain land. By 1870 Tipton had disposed of a large amount of this land, as he is listed as owning 1740 acres of which 165 was cultivated (USAC 1870). Some of this land appears to have been sold to Tipton's children based on information contained in his will (Loudon County Will Book A).

Monroe County deed books contain five references to John B. Tipton purchasing slaves. A record of sale in March 1825 indicates that he purchased three women and a man from Absalom Smith (Monroe County Deed A/9). In 1830 he purchased a woman and her child (Monroe County Deed A/254), and in April 1833 two records indicate he purchased three children between the ages of 7 and 10 (Monroe County Deed A/387). The final reference to Tipton purchasing a slave was in 1834 when he purchased a 23 year old male. Further evidence of Tipton owning slaves is located in the federal census records. According to the 1830 census, he owned a female and a child (USPC 1830), and the 1840 census indicates he owned six slaves (USPC 1840). The 1860 slave census indicates he owned three slaves, and had one building used for slave housing (USSC 1860).

During Tipton's tenure the farm's production was diversified, with several different grain crops and types of livestock (USAC 1850, 1860, 1870). Table 5.1 presents data drawn from federal agricultural censes that lists the farm's production. The primary crops were corn, wheat, and oats. Tipton and his family also raised numerous stock animals, which were probably sold at market. It appears that there was production for the household such as potatoes and butter and surplus goods were sold outside the home.

Table 5.1. Agricultural Production at the Tipton/Dixon House Site Based on United States Agricultural Censuses.

Year	Acreage		Crops			
	Improved	Woodland	Wheat Bushels	Corn Bushels	Oats Bushels	Hay Tons
1850	200	11,000	60	2,500	300	**
1860	230	13,000	248	1,200	**	12
1870	165	1,585	200	400	100	18
1873*	***	***	150	600	150	***
1880	60	115	180	500	150	**

Year	Livestock				
	Horses	Cattle	Sheep	Swine	Poultry
1850	11	38	40	100	***
1860	5	27	42	38	***
1870	7	12	49	10	***
1873*	2	5	36	10	***
1880	4	11	28	31	90

Year	Other					
	Cotton Bales	Wool Lb.	Irish Potatoes Lb.	Sweet Potatoes Lb.	Butter Lb.	Molasses Gallons
1850	**	**	**	20	100	**
1860	150	60	20	150	200	**
1870	**	100	5	40	**	**
1873*	***	***	***	***	***	***
1880	**	100	5	5	50	10

* Information from John B. Tipton's estate inventory.
** Apparently none produced.
*** No information provided.

The drop in production between 1860 and 1870 probably relates to Tipton selling off much of his property and the end of slavery.

The property stayed in John B. Tipton's possession until his death in 1873, at which point it passed to his wife Louisiana Wear Tipton. Tipton willed to Louisiana (or Louisa) the home place, 30 acres on the south side of the Little Tennessee River, the Morganton Ferry and associated landings, his money on hand, and all the crops and livestock (Loudon County Will Book A). In addition, he had given some of his land to his sons Malcom and Gilbert, while the remainder of his children received money. It was also stipulated in his will that following Louisa's death his children Caswell and Aurelia were to split the home place.

According to the 1880 agricultural census, Louisa farmed 175 acres with 60 acres in cultivation (USAC 1880). The farm continued to be diversified with grain crops and livestock remaining important and the continuing production of fruits and vegetables. The census reports that Louisa paid out $250 in farm labor and hired for 52 weeks of work. Louisa held onto the property until her death in 1893, at which time Caswell and Aurelia split the 375-acre home place. Caswell gained control of the north 175 acres of the property, while Aurelia received the 170 acres containing the house and ferry landing plus 30 acres on the south side of the river with the other ferry landing (Loudon County Deed 14/259).

Aurelia apparently lived in the house with her brother John (USPC 1900). Based on census records it appears that several hired farm laborers lived on the property as Aurelia is listed as a landlord in the 1900 population census (USPC 1900). Aurelia never married and upon her death the Tipton heirs sold the property and divided the proceeds. In December 1909, T.T. Webb and J.K. Walters of Hawkins County, Tennessee, purchased the land via Clerk and Master sale (Loudon County Deed 20/277). It is not apparent if Webb or Walters lived on the property during this time. Webb, Walters, and their respective wives then sold the property to Sam R. Cusak in May 1914 (Loudon County Deed 29/331). According to the 1920 census Cusak lived on the property with his wife, children, mother-in-law, and a nephew (USPC 1920).

Cusak sold the property to Sam Sparks in January 1931. Apparently Sparks could not keep up the payments, and in 1933, C.P. and Laura Taliaferro assumed the remainder of the note and took control of the property (Loudon County Deed 37/348). In 1937 the Taliaferros also purchased the land that Caswell Tipton had inherited (Loudon County Deed 39/462). When C.P. Taliaferro died he willed one-half the property to his wife Laura and the other half to their daughter Elizabeth (Loudon County Will Book B). In 1939 Laura Taliaferro died and willed her share of the property to Elizabeth (Loudon County Will Book B/Loudon County Deed 40/512).

Sometime between 1939 and 1963 Elizabeth Taliaferro married Rueben T. Sharp and then sold the property to J.D. and Sarah Lee in 1963 (Loudon County Deed 75/190). In 1969 the Lees sold the property to TVA, after which the farm was abandoned. The buildings were demolished in the late 1970s. The house and outbuildings were burned, razed, and pushed into two trenches that were subsequently capped with a clay layer (Ahlman 1998; Ahlman et al. 1999), a destruction method typical for historic properties in the Tellico Reservoir area.

Archaeological Investigations

The Phase I survey of the site involved general surface reconnaissance of the site area and controlled surface collection of a "designated area [that] was plowed" (Carnes 1980:29). This survey recovered 1619 historic artifacts that dated from the early 19th century through the mid to late 20th century. A few prehistoric artifacts were recovered and the site was assigned to the Late Archaic period.

In December 1997, the University of Tennessee was contracted by Mr. Jerry Walter of Rarity Bay on Lake Tellico to conduct Phase II archaeological testing of the site. Under an agreement between TVA and the Tellico Reservoir Development Association, the site was subject to compliance with Section 106 of the National Historic Preservation Act prior to development of the site area. The Phase II testing was conducted to evaluate the site's eligibility for the National Register of Historic Places.

An in depth discussion of the Phase II testing is provided in Ahlman (1998). This discussion is meant to provide a general sketch of the procedures used during that phase of the project. The Phase II testing involved establishing a reference grid for mapping, excavation of mechanically stripped trenches, and the hand excavation of opportunistic 1 x 1 m test units. To facilitate the mapping of the site and identifying the backhoe trenches, an arbitrarily numbered mapping grid was established over the site. A primary datum (1000N/1000W) was placed near the western edge of the project area. The north/south grid line was oriented approximately 3^0 off magnetic north. Elevations were established from the TVA property marker placed at 250 m (820 ft) above mean sea level.

Twenty 1 m wide backhoe trenches were excavated across the western two-thirds of the project area (Figure 5.2). No backhoe trenches were placed in the eastern one-third of the project area because of the extreme slope. Twelve trenches were oriented north-south at 10 m intervals along the 1000N grid line. Each trench consisted of a north and south section divided by an approximately 8-10 m wide unexcavated balk. Two shorter trenches were excavated in the central portion of the site to expose identified features. Six short trenches were also excavated at the southern end of the project area to identify any possible deposits between the base of a small slope and the adjacent TVA property line. The north-south trenches were expanded in several locations to further investigate identified cultural features.

In certain places, 1 x 1 m test units were excavated to explore cultural features that were identified on the ground surface. These units were placed on the grid and excavated in arbitrary 10 cm levels to sterile subsoil. All soil was passed through 6.4 mm (1/4 in) hardware cloth and all cultural material retained.

Identified cultural features encountered in backhoe trenches and test units were exposed using hand tools, mapped, and photographed. Features and post holes were sampled by first excavating one-half and passing the soil through 6.4 mm hardware cloth and retaining all recovered material. Profile drawings were made and photographs taken of each excavated feature.

The Phase II testing identified 23 features and 21 possible postholes as well as the remains of seven structures (dwelling, hog house, crib, root cellar, wash house/smoke house, smithy, and silo). Based on the testing phase, it was determined that the

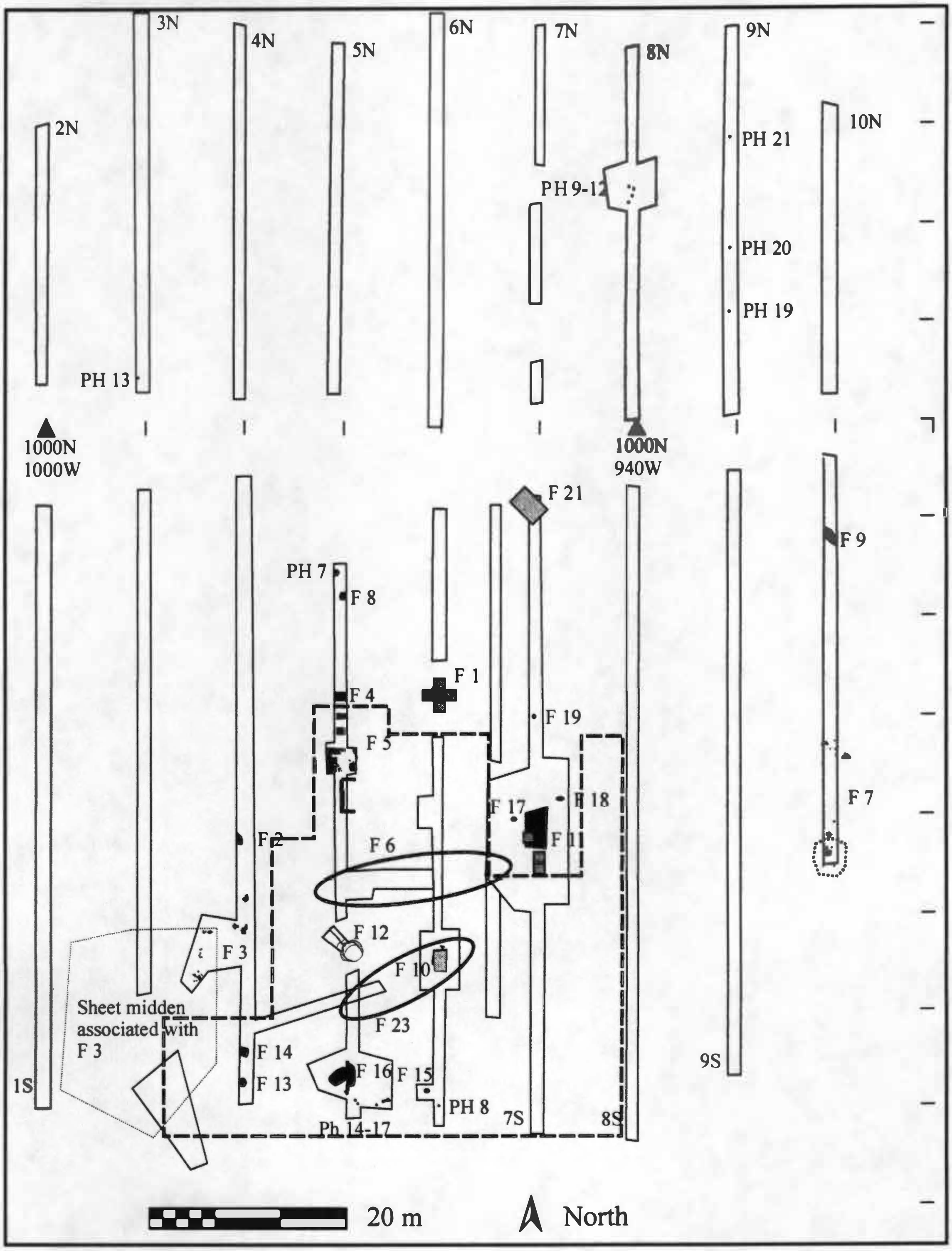

Figure 5.2. Areas of Tipton/Dixon House Site Investigated by Phase II Testing (Adapted from Ahlman 1998).

Tipton/Dixon House site was eligible for inclusion in the National Register of Historic Places (Ahlman 1998; Ahlman et al. 1999). Because development of the property was eminent and the important features could not be avoided, Phase III data recovery was undertaken by the University of Tennessee in the fall of 1998.

The Phase III data recovery of the site intended to establish the construction sequence of the historic dwellings at the site, to gain a better understanding of enslaved African-American life in the Upland South, and to determine the changing layout of the site as it referred to changing behaviors (Ahlman et al. 1999). To accomplish these goals, the Phase III data recovery involved the mechanical stripping of the backyard area of the house and the hand excavation of 1 x 1 m test units. The mechanical stripping removed the overburden in 5-10 cm increments with a 1 m wide, smooth-edged bucket to sterile soil or until a cultural feature was encountered. Approximately 1400 m^2 of the project area was removed by mechanical stripping (Figure 5.3).

Eighty-five 1 x 1 meter and four 1 x 2 m test units were excavated during the Phase III data recovery. The majority of the units were excavated in arbitrary 5 cm levels. The soil matrix from two units was retained for flotation, and the matrix from three 1 x 2 m units was not screened because of extensive disturbance and rubble. The test units were excavated in four areas of the site to define the prehistoric components, the possible enslaved African-American quarters, and the architectural remains relating to the dwellings. The Phase III data recovery identified 27 additional features, 33 additional postholes, and further investigated the remains of four features identified during the Phase II testing.

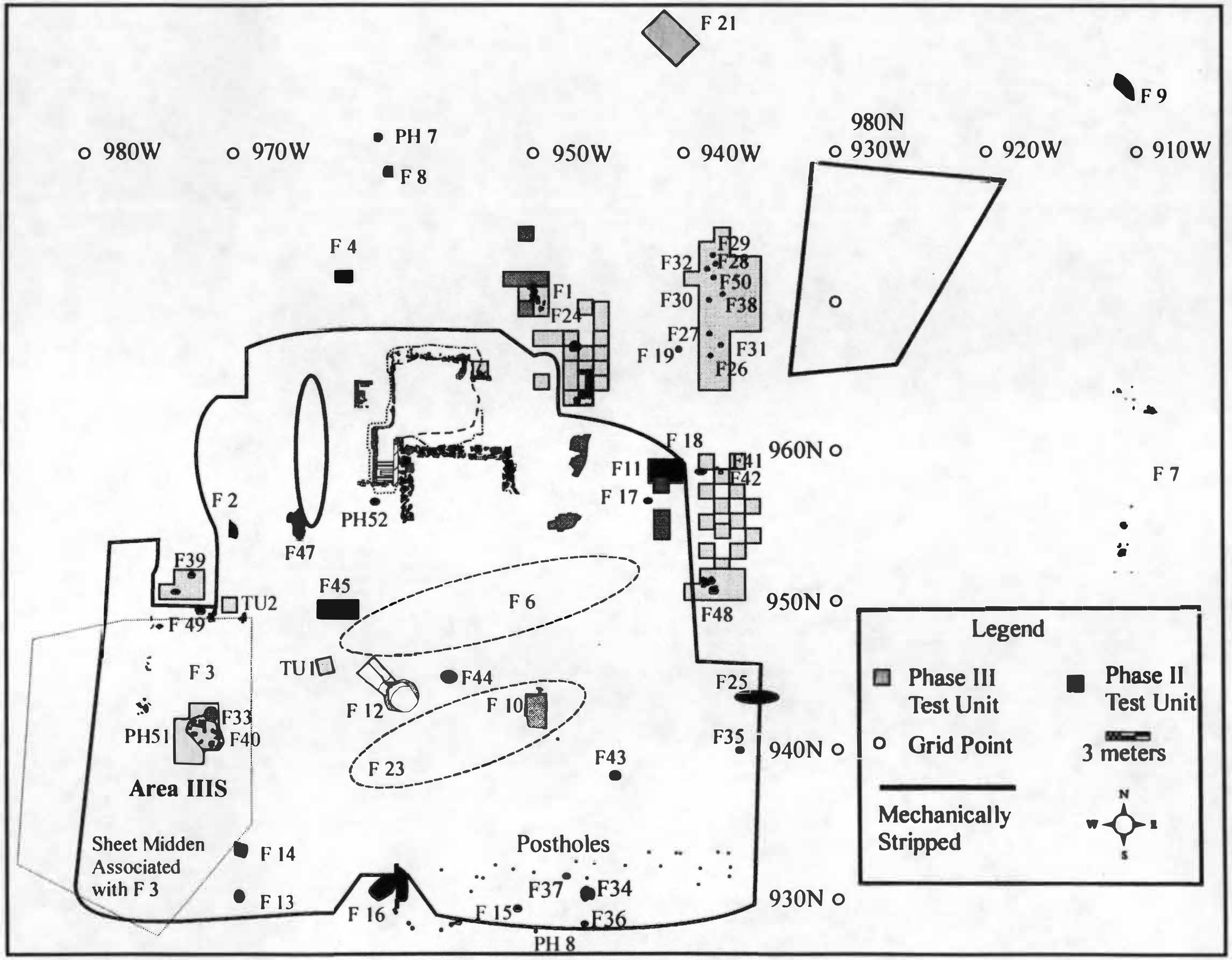

Figure 5.3. Areas of Tipton/Dixon House Site Investigated by Phase III Excavations (Adapted from Ahlman et al. 1999).

Excavation Results

The Phase II and III archaeological investigations at the Tipton/Dixon House site identified 50 features (Table 5.2) and 54 possible postholes (Ahlman et al. 1999). Seven features dated to the prehistoric occupation of the site, four features were determined to be non-cultural stains, and five stains identified as features were later determined to be postholes. Ten stains initially identified as postholes were determined to be either rodent burrows or tree stains upon excavation.

A total of 14,249 historic period artifacts was recovered during the Phase II/III investigations (Ahlman 1998; Ahlman et al. 1999). The majority of these artifacts date from the late 19th century through the mid-20th century. The most frequent artifacts were curved glass (N = 5793) followed by nails (N = 3102), ceramics (N = 1666), flat or window glass (N = 1325), metal objects (N = 1226), miscellaneous objects (N = 855), and construction material (N = 295).

The remains of eight structures and five structurally related features were identified during the Phase II/III investigations that have implications to this study. The interpretation of the structural remains and feature function came from the recovered artifacts, feature characteristics, and the TVA land acquisition map of the property that was produced in 1967 (Figure 5.4). Additional information on structure location and function came from Larry and James R. Lane, who lived at the site from 1942 to 1955 (Ahlman 1998; Ahlman et al. 1999)

Table 5.2. Features Identified During Archaeological Investigations at the Tipton/Dixon House Site.

Feature No.	Description	Temporal Period
1	Southeast-northwest brick walkway along the house	20th century
2	Oval dark soil stain, associated with Feature 3	20th century
3	Stone piers, brick, and sheet midden from smokehouse/wash house	20th century
4	East-west brick walkway along the house	20th century
5	Brick chimney pad, cellar, and piers from house	Early 19th to 1970
6	Northern TVA demolition trench	Late 1970s
7	Stone piers and sheet midden from hog house	Pre 1940s
8	Square dark soil stain, no diagnostics	Historic?
9	Irregular soil stain, no diagnostics	Prehistoric?
10	Shallow lined root cellar, possibly under a shed	20th century
11	Stone and brick chimney pad from early log cabin	Early 19th century
12	Cistern and drain	Early 20th century
13	Trash-filled depression (privy?)	Mid 20th century
14	Oblong basin-shaped pit, possibly privy	pre 1940s
15	Trash filled depression	Historic
16	Pad, posts, and fired area of possible smithy	Late 19th century
17	Circular dark soil stain from tree root disturbance	
18	Stone pier for early log cabin	Early 19th century
19	Debris-filled basin-shaped pit	Late Woodland
20	Possible circular pit	Prehistoric
21	Concrete pad and gravel driveway	Post 1957
22	Concrete silo foundation	Early 20th century

Table 5.2. (continued).

Feature No.	Description	Temporal Period
24	Brick and limestone porch pier	19th-20th century
25	Sorghum furnace/molasses trough	Late 19th century
26	Rock cluster	Prehistoric
27	Posthole	20th century
28	Charcoal filled pit	Late Woodland
29	Charcoal filled pit	Late Woodland
30	Circular dark soil stain from tree root distubance	
31	Historic posthole	20th century
32	Historic posthole	20th century
33	Shallow ashy basin	19th century
34	Historic privy	20th century
35	Square soil stain	20th century
36	Pipe turn off valve	20th century
37	Historic hearth (smokehouse)	Early 20th century
38	Rodent run	
39	Shallow pit	Mid 20th century
40	Shallow pit cellar (African-American slave dwelling)	Early 19th century
41	Historic posthole	20th century
42	Historic posthole	20th century
43	Circular dark stain from tree root disturbance	
44	Telephone pole	20th century
45	East-west brick walkway	Mid 19th century
46	Dark, circular stain	Early 19th century

Table 5.2. (continued).

Feature No.	Description	Temporal Period
48	Limestone footers for early log cabin	Early 19th century
49	Posthole, trash filled pit	Early-mid 19th century
50	Bell-shaped pit containing prehistoric artifacts	Late Woodland

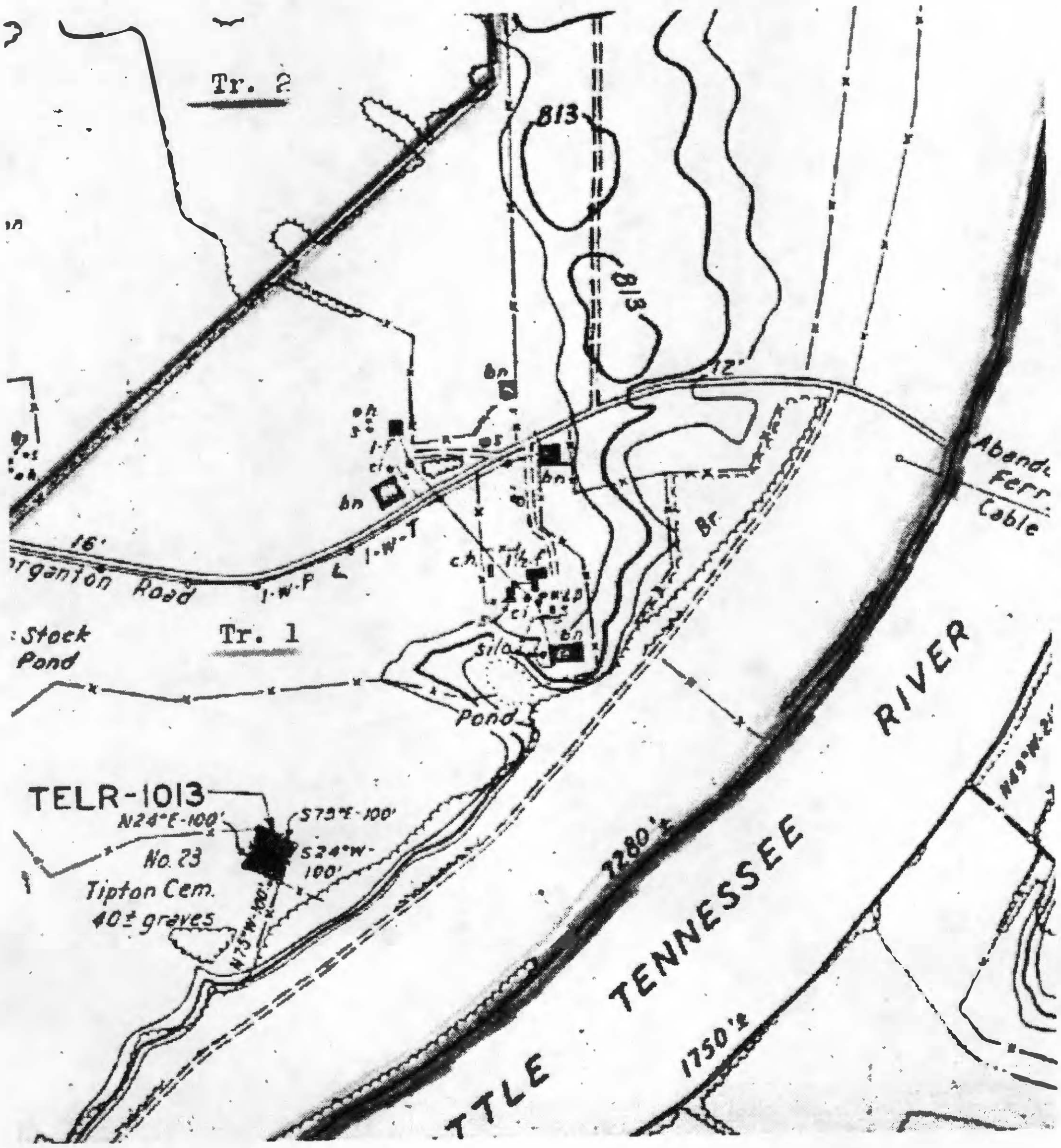

Figure 5.4. Tennessee Valley Authority Land Acquisition Map (421K506-10) of Tipton/Dixon House site.

Feature 3, Structure 1 consists of seven limestone block and brick clusters, three individual limestone blocks, and a set of brick steps that represent the remains of a two pen wash house/smoke house depicted on the TVA land acquisition map (Figure 5.5). This structure was probably not constructed until the early 20th century based on the recovered window glass (Ahlman et al. 1999), which had an average thickness of 2.25 mm and a mean date of 1902 (Moir 1987).

Feature 5 is the remains of the brick and frame dwelling (Figure 5.6). These architectural remains consist of two hand-made brick end chimney pads, a brick and stone lined cellar, limestone foundation piers, several brick walkways, porch piers for the frame portion of the house, and a partial stone foundation of the brick portion of the house. Based on photographs supplied by the Lanes (Plate 5.1), the brick portion of the house was constructed of American common bond with four stretcher rows and one header row and had six-over-six lights (Ahlman 1998). The brick portion of the house was probably built in the late 1820s or early 1830s based on the brickwork and window arrangement. The frame portion of the house was a two-story I house with two end chimneys and a front porch (Plate 5.2). Based on the chimney's brickwork and the recovered window glass, with an average thickness of 1.43 mm and a mean date of 1834.82 (Moir 1987), it has been hypothesized that this portion of the house was constructed around 1835 (Ahlman et al. 1999).

Feature 7, Structure 2 consists of two limestone block clusters and a scatter of 20th century artifacts (ceramics and glass). The Lanes identified this area of the site as the

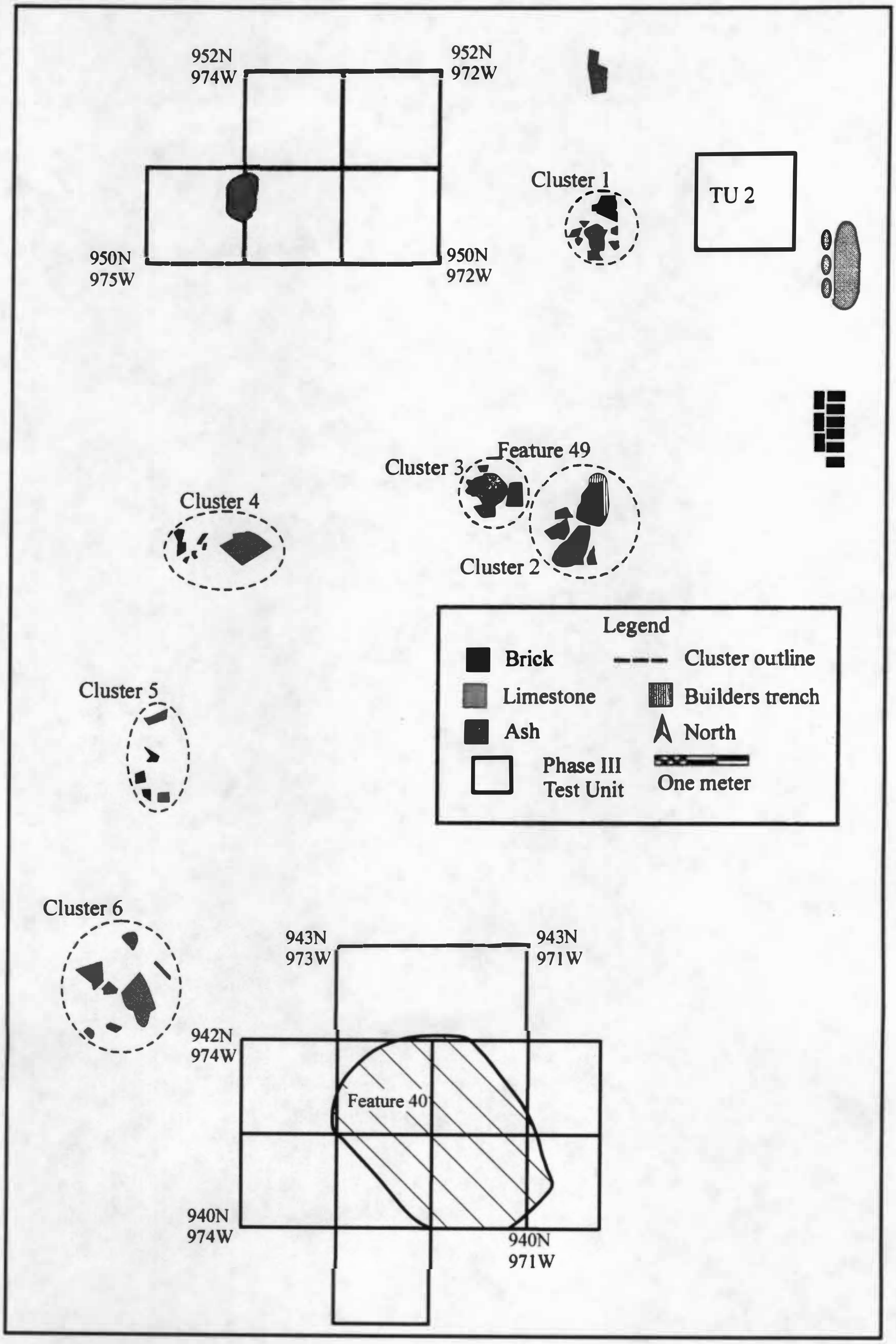

Figure 5.5. Plan View of Feature 3, Structure 1 and Feature 40.

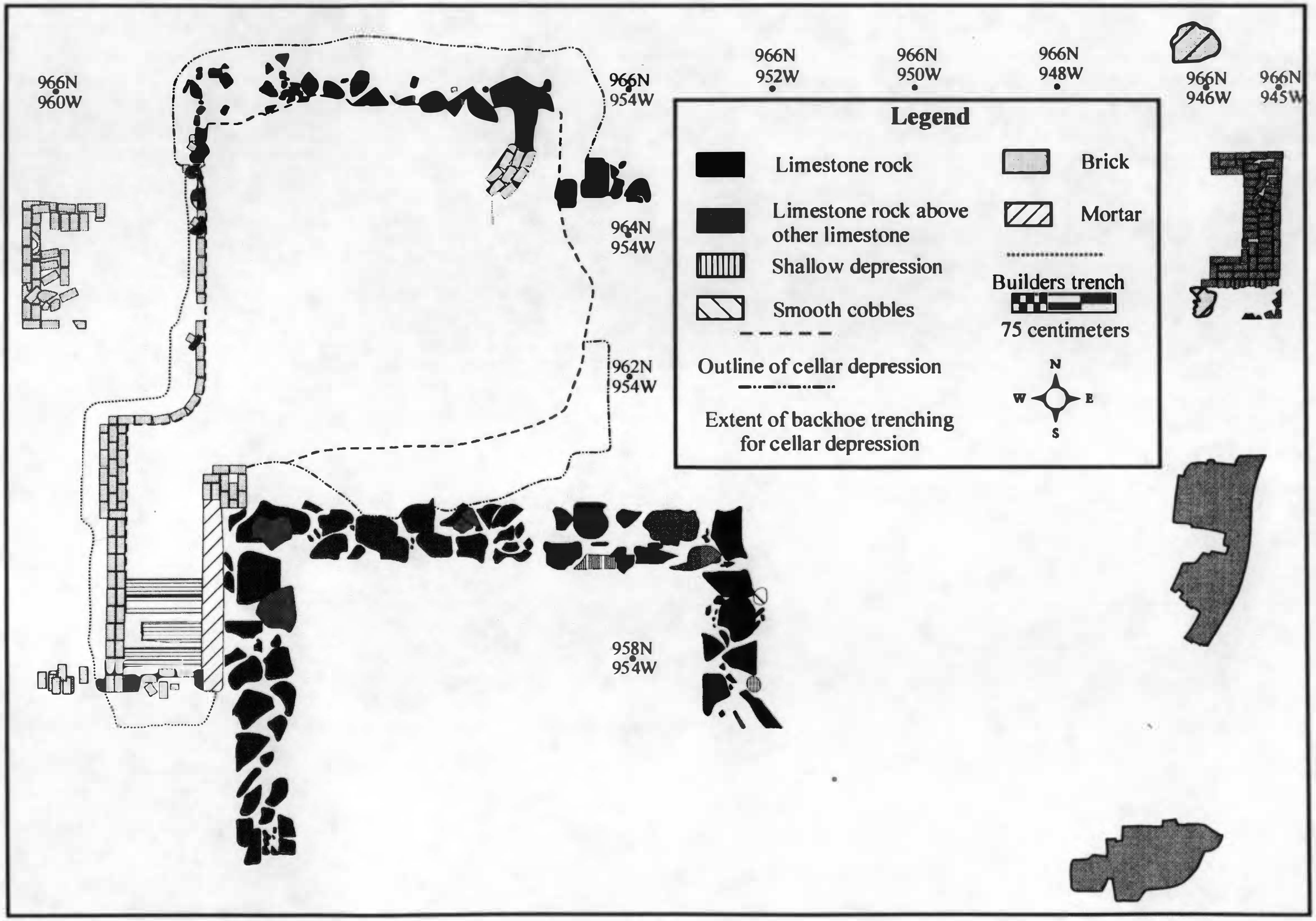

Figure 5.6. Plan View of Feature 5.

Plate 5.1. The Brick Portion of the House in the 1940s (courtesy of L.Lane).

Plate 5.2. Tipton/Dixon House in 1976, Prior to Demolition by TVA (photograph by L.Lane).

location of a hog house during their tenure. This building does not appear on the 1967 TVA land acquisition map, indicating it was removed from the farmyard by that time.

Feature 10 is the remains of a small root cellar. This feature was identified at the base of a TVA demolition trench and was only partially intact. It consisted of a single course of stretcher brick faced with concrete. The machine-made brick and concrete suggest this building was constructed in the 20th century. The Lanes do not remember a building in this location during the time they lived on the property. A photograph of the back of the house in Sands (1989) shows a low shed in this location, which could have been the entrance for this root cellar.

Features 11, 18, and 48 are the remains of the early log cabin on the property (Figure 5.7). Carnes (1980) and Sands (1989) indicate that William Dixon lived in a log cabin and the first Monroe County Circuit Court was held in this structure. Feature 11, a scatter of hand-made brick and limestone rubble, is probably the remains of the chimney and features 18 and 48 are limestone piers for the cabin. Recovered window glass indicates an approximately 1820 initial construction date for the building (Ahlman et al. 1999). The recovered ceramics include blue and polychrome hand painted pearlware. The Lanes indicated that they butchered hogs in the general location of this structure during their tenure at the site.

Feature 12 is a cistern that was located behind the house. This cistern was constructed of limestone and faced with concrete. This feature appears on the TVA land acquisition map; however, the Lanes never remembered using this cistern as the house had a well and pump when they lived there.

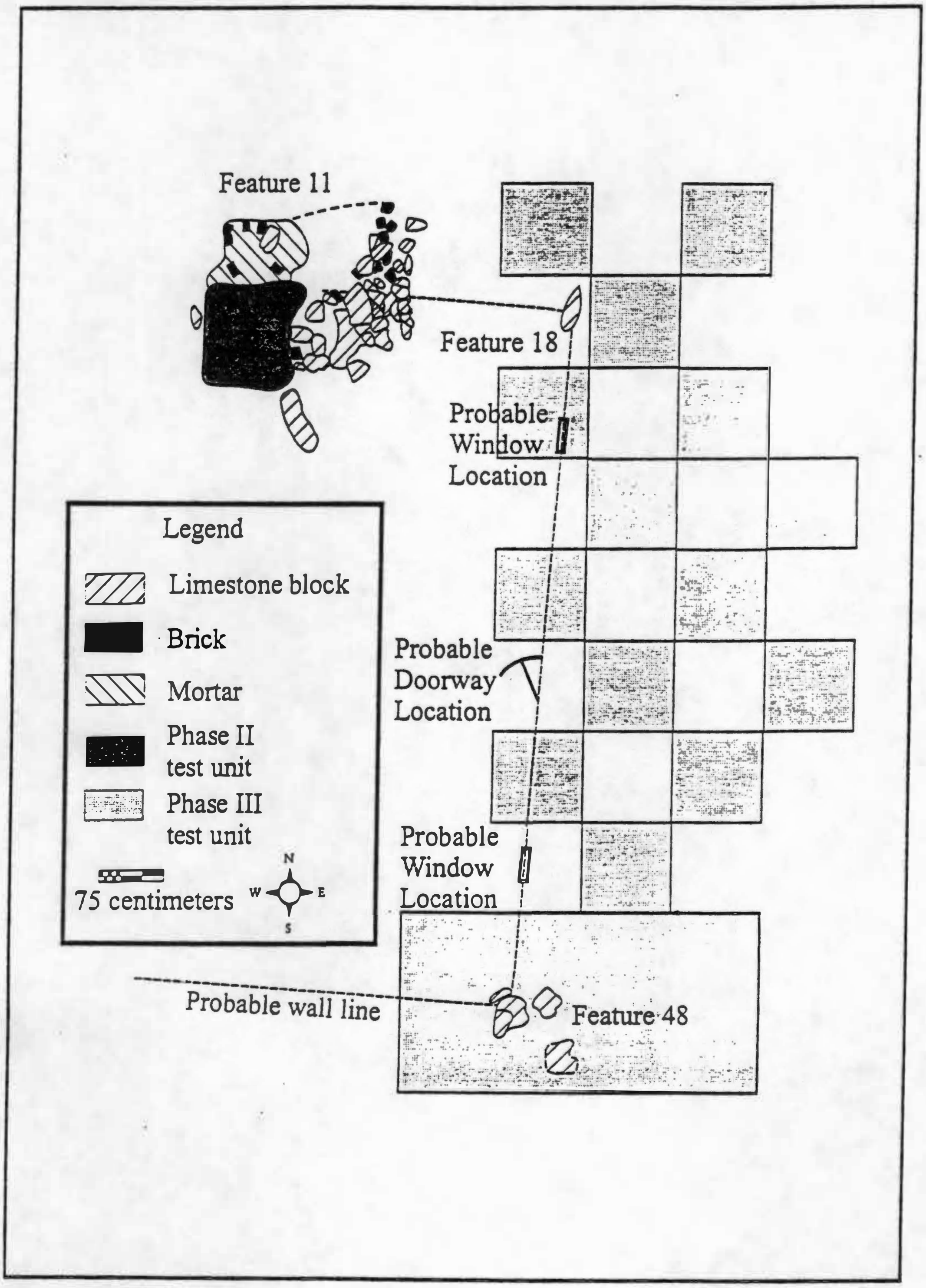

Figure 5.7. Plan View of Features 11, 18, and 48, the Early Log Cabin Remains.

Feature 16 consists of a probable smithy or blacksmith area at the back of the rear yard. The feature consists of a line of brick adjacent to a scatter of fire-cracked rock. On the side opposite the fire-cracked rock, the ground was hard-packed and covered with ash. Numerous large iron pieces were also recovered around the feature. The Lanes do not remember any structure in this location and no buildings are depicted here on the TVA land acquisition map.

Feature 22 is a concrete silo foundation located on the Tellico Reservoir cut bank. This silo is not indicated on the TVA land acquisition map; however, the Lanes remembered a silo foundation in this location while they lived at the site. James R. Lane remembered their landlord providing them with the materials to build a new silo next to the more recent barn on the property in the late 1940s, which is indicated on the TVA land acquisition map (Ahlman 1998). Several large limestone blocks were noted on the beach that probably represent the remains of a barn that was built earlier in the property's history.

During the Phase II and Phase III investigations several pits and ash stains were identified. Two of the pits (features 13 and 14) are shallow, filled with mid-20th century trash, and were interpreted as privies (Ahlman 1998). The Lanes indicated that during their tenure on the farm there was a privy in the location of Feature 14. Numerous animal bones were recovered from one ash stain (Feature 47), which was interpreted as a smoke house floor (Ahlman et al. 1999). The other ash stain (Feature 25) was shallow and cigar shaped, and was interpreted as a sorghum molasses furnace (Ahlman 1999). The other pit (Feature 40) was interpreted as a shallow pit cellar under the slave quarter (Ahlman et al.

1999). This pit cellar was filled with faunal remains, pearlware (which was similar to the material recovered around Feature 11), buttons, and two blue glass beads. The location of this pit, near Feature 3, Structure 1, confirmed where Ahlman (1998) predicted the slave quarter would have been located (Figure 5.5).

Farmstead Layout

The Tipton/Dixon House site has a complex history that includes several different occupants. The archaeological and archival data have helped create one of the most intact site histories in East Tennessee, making an in-depth examination of the changing layout of this site possible. This discussion of the Tipton/Dixon House site layout will facilitate the later discussion of how a resource maximization strategy was undertaken and maintained through time by the farm's occupants. The data for the discussion of the farmstead layout through time come from several different sources: archival sources; the Phase II/III archaeological investigation; TVA land acquisition map (Figure 5.4); deed records; and discussions with Larry and James R. Lane.

Through a synthesis of these data sources, a chronology of the farmstead layout has been established (Ahlman 1999; Ahlman et al. 1999). Ahlman (1999) has determined a sequence of four historic occupations of the site that correspond to the specific occupations of the site and major changes in the farmstead's landscape during these intervals (Table 5.3). These changes, as will be discussed later, did not appear to reflect a change in the strategy undertaken by the farm's occupants but rather are variations in the manner that this strategy was pursued.

Table 5.3. Major Occupation Periods at the Tipton/Dixon House Site.

Period	**Years**	**Major Occupants**
Early Farmstead	1819-1820s	William Dixon, Tipton Family
John B. Tipton Tenure	1820s-1873	Tipton Family
Late 19^{th}-Early 20^{th} Century	1873-1939	Tipton Heirs, S.R. Cusak, Sam Sparks
Mid 20^{th} Century	1939-1969	Lane Family, other tenants

Early Farmstead (1819-late 1920s)

This period coincides with the William Dixon and early John B. Tipton occupation. Very little is known about this period because there is scant archival and archaeological data. What is known is that the farmstead layout centered around the early log cabin that faced the Little Tennessee River (Figure 5.8). The only other known structure during this period is the African-American dwelling to the east of the log cabin. There probably were other buildings and features associated with agricultural and food production during this period but it appears that later activities in the house yard have obscured much of the information relating to these early structures and features.

John B. Tipton Tenure (1820s to 1873)

During John B. Tipton's occupation from the 1820s to 1873, the farmstead went through a lengthy period of expansion and dispersal where new buildings (Figure 5.9) were constructed reflecting the Tipton's growing political importance and the families' efforts to increase agricultural and food production. By 1830 the early log cabin had been replaced by a one-story brick house that faced the Little Tennessee River. By the late 1840s, a frame addition was added to the brick house becoming the facade of the house that now faced the Morganton Ferry Road. The shift in the facade reflects the change in approach to the farm as well as what might be perceived as Tipton's conspicuous display of wealth to travelers along the road.

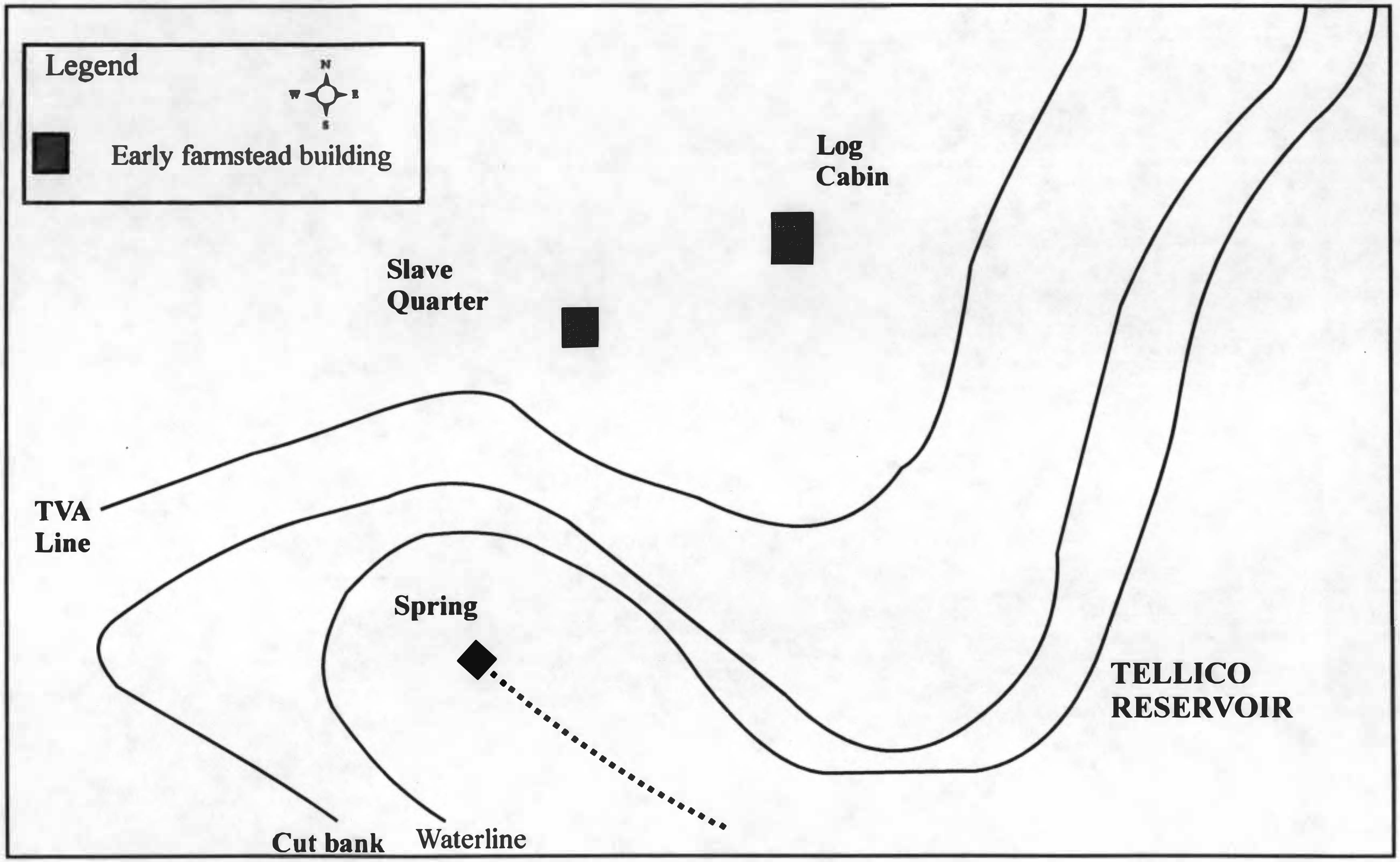

Figure 5.8. The Early Farmstead Layout.

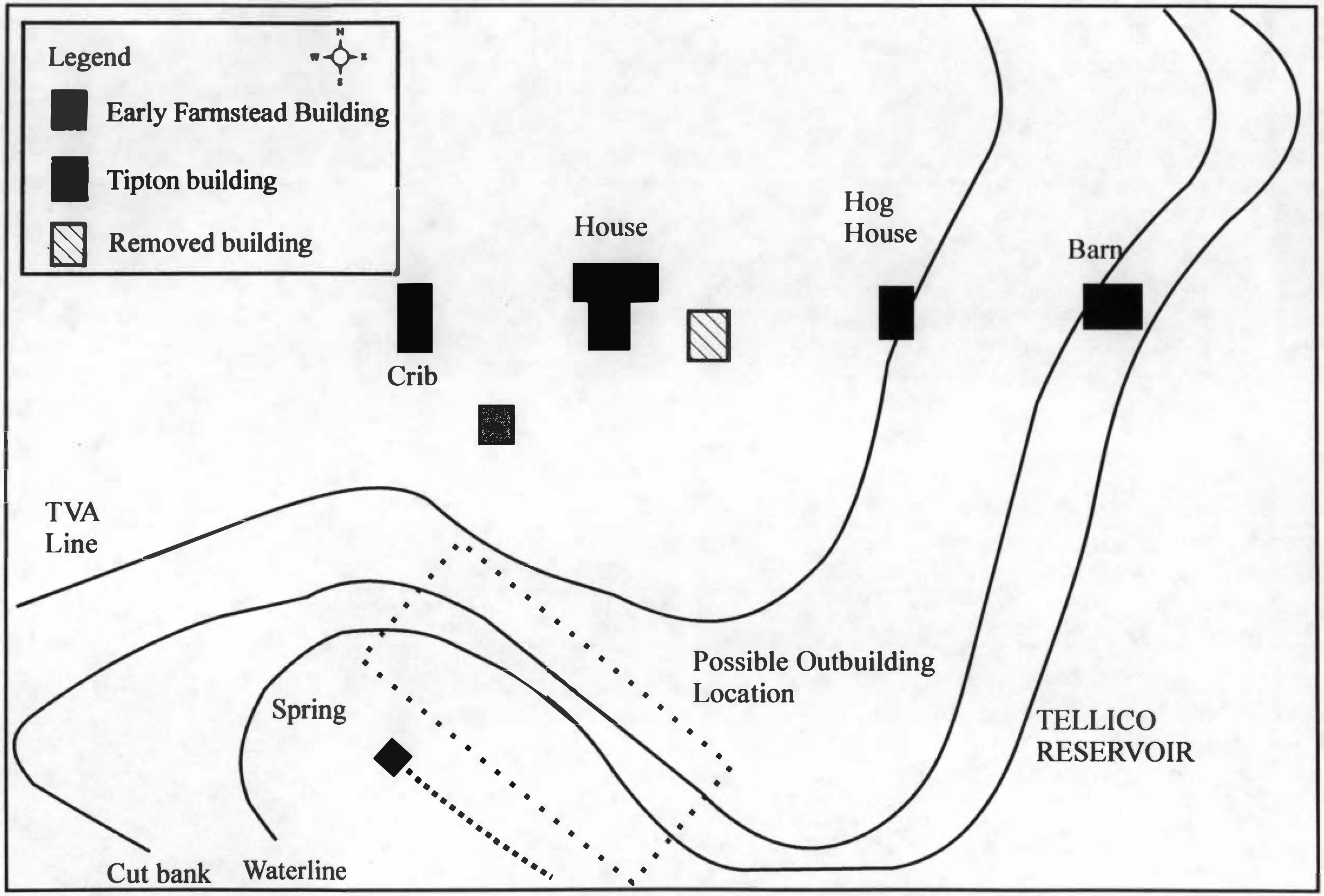

Figure 5.9. The Farmstead Layout During John B. Tipton's Tenure.

Numerous buildings appear on the farm's landscape during this period. Agriculturally related buildings include a corn crib, hog house, and barn. The barn and hog house were probably built after the frame addition was added because these buildings lie between the house and the river. In addition, the African-American slave dwelling persists through the Antebellum Period as evidenced by Tipton's slave quarter listed in the 1860 census. This building appears to be used through the 1860s, at which time it was removed from the landscape.

There is sparse structural and artifactual evidence to interpret the behaviors that occurred in the yard around the house. No features or structural remains relating to food production were identified during the Phase II/III archaeological investigations. The remains relating to these structures were probably obscured by later activities in the rear yard and by TVA's demolition of the structures in the 1970s. It can be assumed that there was a smoke house or meat house on the property at the time of Tipton's death because he is listed as owning 1500 lbs. of bacon at that time.

While structures and features generally associated with activities relating to food production were typically performed in the yard, they appear to have been located further away from the dwelling than expected. There is a suggestion that these structures were located to the south of the dwelling near a spring because no well or cistern dating to this time period was recorded during the excavations (Ahlman 1999; Ahlman et al. 1999). This area of the site is located on TVA property and was not investigated because this area will be preserved from development. A surface collection from the exposed Tellico Reservoir beach produced stoneware and curved glass sherds that date to the mid-19th

century (Ahlman 1998) . Relative to the amount of this material recovered on the remainder of the site, these artifacts suggest a higher concentration of human activity and disposal occurred during this period here.

Late 19^th^ – Early 20^th^ Century (1873-1939)

During the late 19th and early 20th century, when the site was occupied by the Tipton heirs and a subsequent series of owners who probably lived at the site, there is a continued dispersal of the farm buildings as well as the addition of numerous other buildings (Figure 5.10). Structures that persisted from the earlier period include the barn, crib, and hog house while the slave quarter was removed. Another barn was added south of the house and a silo was built adjacent to the first barn. There is evidence for privies located closer to the dwelling as well as a cistern near the kitchen. A two pen shed, which housed a smoke house and wash house, two other smoke houses, a sorghum processing furnace, a smithy, and a chicken house were also constructed near the dwelling.

An increase in the sheet midden size and density dating to this period was noted during the archaeological investigation (Ahlman 1999; Ahlman et al. 1999). This increase is probably attributable to the greater proximity of the support structures to the dwelling as a result of the construction of the cistern. The addition of a readily available water source would facilitate the performance of these activities in the yard. Ahlman (1999) hypothesized that the construction of a cistern and the subsequent moving of the

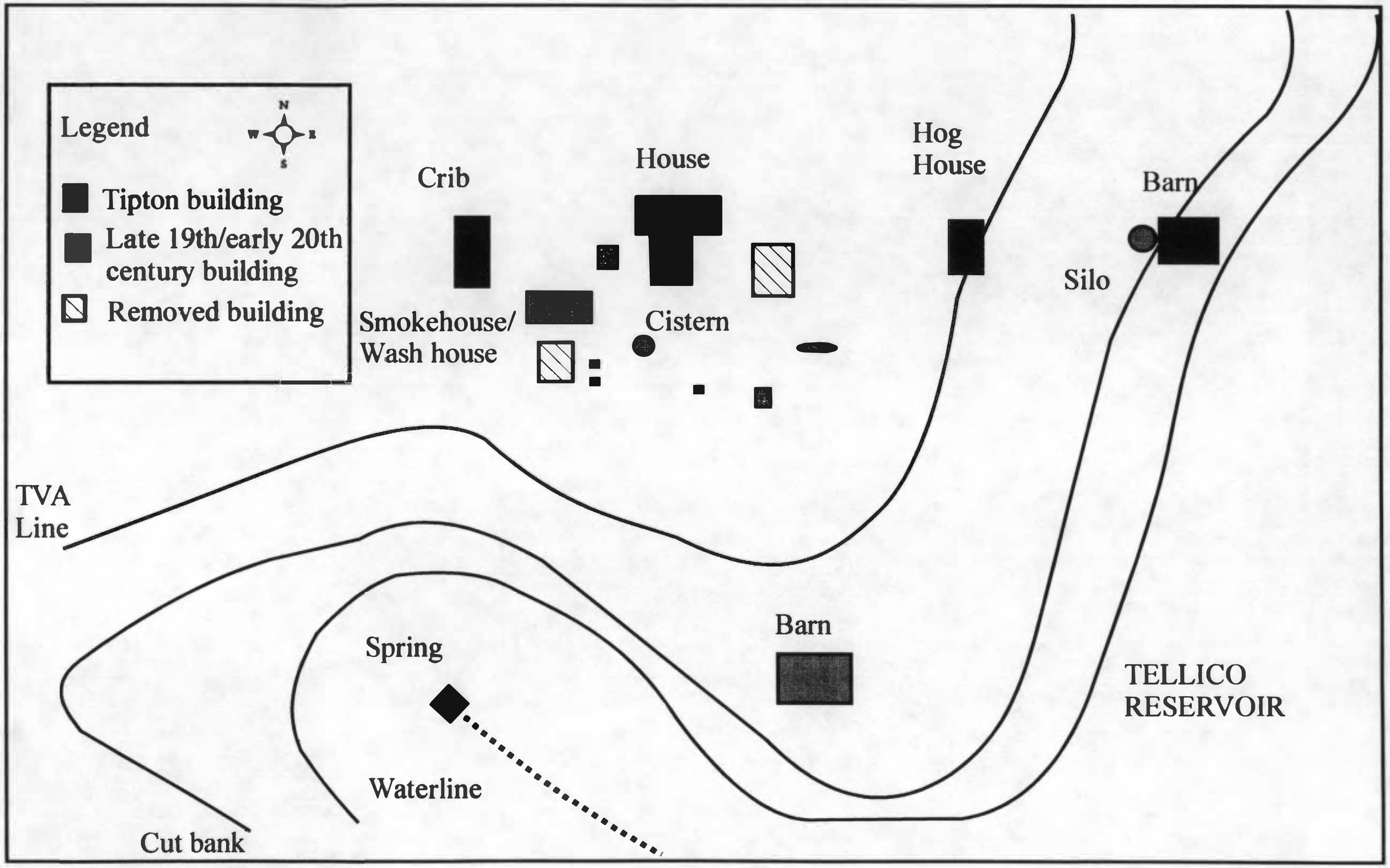

Figure 5.10. The Late 19th-early 20th Century Farmstead Layout.

food production structures closer to the dwelling was initiated by Louisa or Aurelia Tipton following the death of John B. Tipton.

Mid 20th Century

The occupation during this period more than likely coincides with a series of tenants at the site. The primary source of information for this period comes from conversations with Larry and James R. Lane (see Ahlman 1998) and the 1967 TVA land acquisition map of the property. During this period, the older barn and silo were removed and a new silo was constructed near the newer barn (Figure 5.11). The hog house was abandoned and removed as indicated by the 1967 TVA land acquisition map. The crib was either removed or converted into a chicken house. The chicken house constructed in the earlier period became a coal shed. The cistern was abandoned and replaced by a well and pump adjacent to the dwelling. A small root cellar was constructed that probably replaced or supplemented the cellar or cellars under the house. It was also during this period that the house was electrified and indoor plumbing was installed. The Lanes remember the farm being mechanized by the time their family occupied the place, and the farm remained mechanized throughout the mid 20th century. The sheet midden around the house appears to have been the densest during this period of occupation.

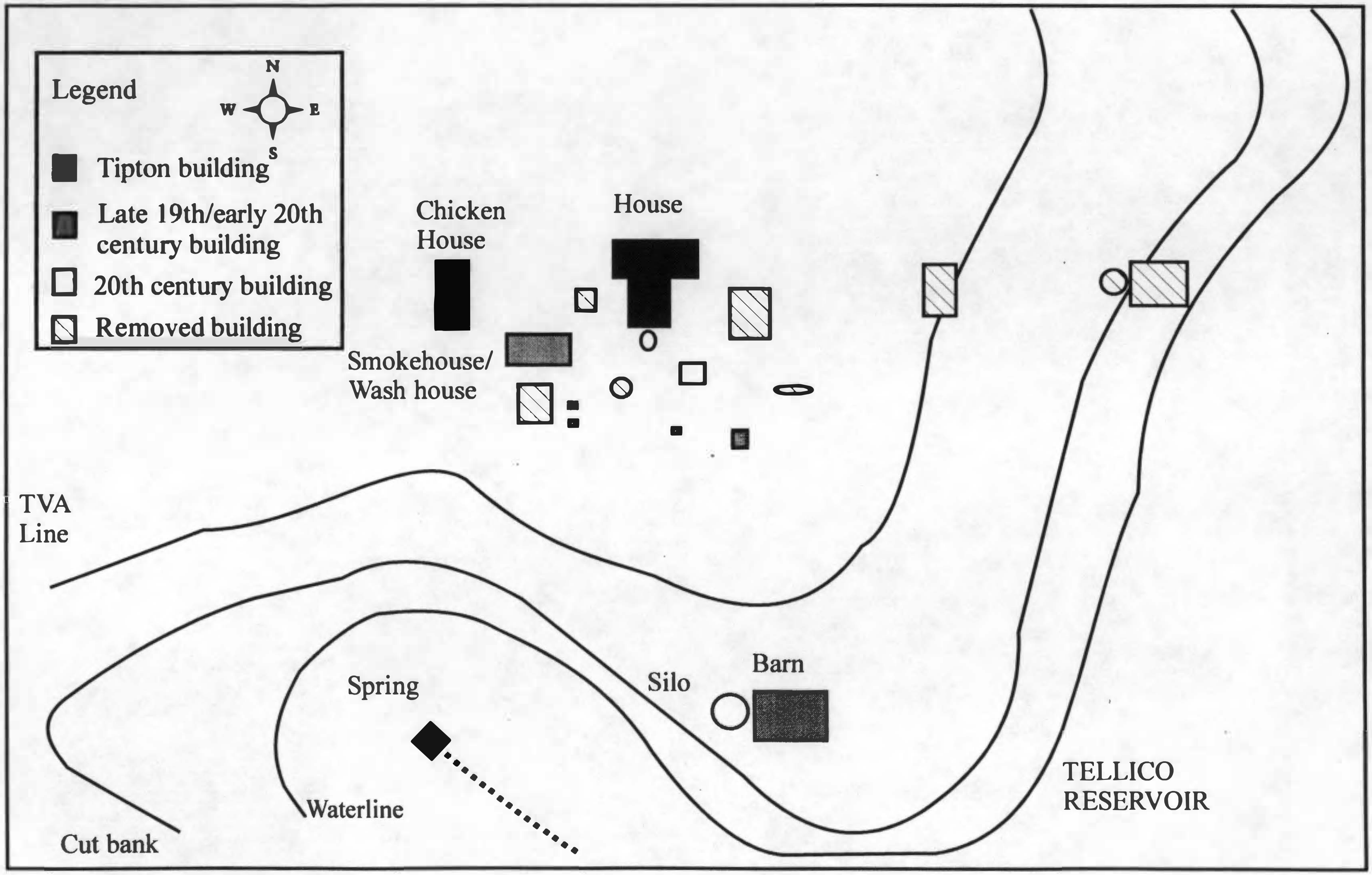

Figure 5.11. The Mid-20th Century Farmstead Layout.

Resource Maximization Strategy

Ahlman, Frankenberg, and Pritchard (1999; Ahlman 1999) suggested that the Tipton/Dixon House site was an atypical Upland South farm. First, they argue that there were few outbuildings during the initial historic occupation, although this may actually be characteristic of Upland South farmsteads with early occupations (e.g. Exchange Place, 40RE192). They also note that the symmetrical layout of the farm during John B. Tipton's tenure is not like the typical Upland South dispersed layout. This layout is more like a Georgian symmetrical farmstead layout and it is suggested that Tipton, and other wealthier farmers in East Tennessee, attempted to emulate the upper class farmsteads on the Southern Coastal Plain and elsewhere by creating a symmetrical farmstead layout that denoted wealth. They speculate that it was not until the late 19th century that the farmstead began to have a layout more typical of Upland South farms. This dispersed layout continued, through several different configurations, until the farm was purchased by TVA and demolished.

The argument posited by Ahlman et al. (1999) is a valid line of reasoning because the typical Upland South farmstead to which they compared the Tipton/Dixon House site is based on a normative model, which does not exist but is a theoretical construct of archaeologists. The evidence from the Tipton/Dixon House site, and other farmsteads in the Upland South, indicates that there is a small range of variation in the occurrence of different building and feature types within farmsteads in the Upland South. This variation suggests that the Tipton/Dixon House site is more like other Upland South farmsteads then previously suspected. This similarity relates to the resource maximization undertaken by the farmstead's occupants.

During John B. Tipton's early occupation, there appears to have been few buildings on the farm landscape. Based on the evolutionary ecology model outlined above, this configuration is characteristic of a time minimization strategy; however, within 15 years of initial historic settlement of the property the farmstead apparently expanded to include several outbuildings and a new dwelling. This suggests that John B. Tipton and his family were developing a resource maximization strategy where the payoffs included greater wealth and prestige, eventually translating into more buildings on the property. This is further supported by Tipton adding onto his house in a manner displaying his wealth and prestige. John and Louisa Tipton had a relatively large family, 17 children; however, Tipton still purchased enslaved African-Americans. This suggests that Tipton needed a large labor force to care for his crops and livestock. By 1860, Tipton had one of the largest land holdings in Monroe County and was a prominent citizen in local politics (Sands 1989). Therefore, the undertaking of a resource maximization strategy by the Tipton family paid off in wealth and prestige in the local community. By the time Tipton died, he had dispersed a majority of his wealth and land among his children, apparently to insure their continued fitness.

Following John B. Tipton's death the farmstead landscape changed as Louisa and Aurelia Tipton apparently rearranged the house yard in a manner that they conceived to be more convenient to them. Because Aurelia never married and had no children of her own and the other Tipton heirs owned their own property, Louisa and Aurelia hired laborers to work on the farm. This strategy seems to have been beneficial because the 1880 census indicates that the farm was producing almost as much as it was in 1870 when the Tipton's owned and cultivated more land (see Table 5.1).

Because Aurelia Tipton had no heirs, upon her death the farm left the Tipton family's hands, thus ending some 80 years of tenure by one family. Aurelia's apparent choice of not marrying and having children (she may not have been able to have children and chose not to marry) appears to be a maladaptive behavior because it ultimately meant that the property passed out of the Tipton family; however, evolutionary ecological models do not assume that the actors will always choose strategies that have long-term reproductive fitness pay-offs, which is why there is a range of strategies. It is postulated that to Aurelia, the operation of the farmstead may have had a greater short-term payoff relative to a long-term payoff of having children to maintain the family's possession of the farmstead.

In the early 20th century between 1909 and 1939, the configuration of the farmstead indicates that the owners and occupants of the farmstead maintained the resource maximization strategy followed by the Tiptons. The succession of relatively short-term owners, however, suggests that the resource maximization strategy did not have the payoff for these people as it did for the Tiptons. This can be deceiving because the owners may have undertaken other strategies, such as speculating in the real estate market, and the long-term ownership of the property was not part of this strategy. This is just conjecture, however, and it is most likely that the strategy did not pay off for some.

The strategy seemed to work for S.R. Cusak as he owned and occupied the farm for 27 years. During his tenure at the farm, he and his wife had at least three children (USPC 1920). The reason for his selling the property to Sam Sparks is unknown, but it may have been as a result of the effects of the Depression. This suggests that the strategy did not have a long-term benefit for the Cusak family. The Lanes, however, remembered Cusak being around the farm during their tenure, which suggests Cusak may have been a farm manager after he sold the property.

Apparently the resource maximization strategy did not pay off for Sam Sparks because he could not maintain making the payments on the farm and he had to sell the property within two years of acquiring it. Based on the events that transpired after Sparks sold the property, it seems that C.P. and Laura Taliaferro purchased the property with the goal of providing their daughter security after their deaths. Elizabeth Taliaferro, and later with her husband Rueben T. Sharp, appeared to have a manager operate the property with tenants and sharecroppers. The Lanes were one of the tenant families on the property from 1942, when they moved to the property from the Cherokee Reservoir area, until 1957, when they moved to a different house on the Taliaferro property. The farm's layout during the family's tenure and their remembrances, indicates the family had undertaken a resource maximization strategy. The Lane family was a large family with over eight people living in the house during the time they occupied the property, providing adequate labor for agricultural and food production. The various farm improvements they engaged in, attempts at greater agricultural production through mechanization, and emphasis on food production by the family indicates they continued the tradition of resource maximization.

Following the Lane occupation of the farmstead, it was occupied by various tenant families until the property was acquired by TVA in 1969. The layout of the farm based on the 1967 TVA land acquisition map indicates that many of the behaviors undertaken by earlier residents of the property continued to be in place. The barn, silo, and sheds indicate that agricultural production was still important. There are direct indications that food production was still being conducted in the house yard because the building identified by the Lanes as a wash house/smoke house was still standing at the time of acquisition. The electrification of the house and outbuildings probably meant that some of the activities formerly undertaken in the yard were now accomplished in the house. The recovery of prepackaged food wrappers and containers (Ahlman et al. 1999) suggests that the occupants were purchasing these goods and could afford to do such because of the wealth generated by the resource maximization strategy.

Throughout the historic occupation of the Tipton/Dixon House site, the occupants of this farmstead undertook a resource maximization strategy that focused simultaneously on agricultural and food production. Although there were changes in the farmstead layout during the different periods of occupation of the farm, there was a continuity through time in the strategy undertaken by the farm's occupants. In this instance Groover's (1998) mutually exclusive generation and household imprints are not necessarily exclusive because the differences in farmstead layout did not alter the strategy undertaken by the farm's occupants.

CHAPTER 6

DISCUSSION AND CONCLUSIONS

The goals of this dissertation were several fold. First, it endeavored to demonstrate that the evolutionary ecology paradigm is an appropriate paradigm for interpreting and understanding the past. Second, to demonstrate that evolutionary ecology can explain past behavior and address variation in the occurrence of different structure and feature types among Upland South farmsteads. In order to accomplish this, a set of strategies based on an evolutionary ecology optimization model of resource maximization and time minimization was created. It was hypothesized that there was a wide range of variation among Upland South farmsteads reflecting the undertaking of different strategies by Upland South farm families. Statistical analyses were applied to a sample of Upland South farmsteads, primarily from East Tennessee, to test this hypothesis. The results of these analyses were then used to assign the individual farms in the sample into the different strategy sets. Finally, it addressed temporal continuity by an in-depth examination of the Tipton/Dixon House site.

It is argued in this dissertation that evolutionary ecology is appropriate for archaeological interpretation because it includes human intent and innovation to explain, it takes an individual perspective, and it has a recursive hypothesis testing methodology. Evolutionary ecology models are very useful for studying social stratification, ethnicity, gender, and race because they can take into account the perspective of an individual and the intentions this individual had regarding this behavior. For these reasons, an evolutionary ecology perspective was employed in this study to develop an optimization model accounting for the differences among farmsteads in the Upland South.

The set of resource maximization and time minimization strategies developed in this dissertation were broadly defined but not meant to be inclusive of the behavioral range undertaken by Upland South farm families. The four strategies that were developed are based on those activities that the farm family focused the majority of their time, energy, and resources (see tables 3.3 and 3.4). The four strategies for resource maximizers included farm families that focused their time, energy, and resources at both agricultural and food production, at agricultural production rather than food production, at food production rather than agricultural production, or at activities other than agricultural and food production. The time minimization strategies were similar; however, there was a greater investment of the family's time, energy, and resources in activities other that agricultural and food production.

It was hypothesized that this range of behaviors would be reflected by a wide range of variation in the rate of occurrence and type of features and structures found on Upland South farmsteads. To test this hypothesis and the validity of the strategies, three statistical procedures were applied to a sample of Upland South farmsteads. It was expected that the results derived from these analyses would provide data to assign each farmstead into one of the strategies.

As the statistical analyses demonstrated, rather than the expected wide range of variation there is a small range of variation, based on the type of buildings present at each farm, within the Upland South farmstead sample. It was hoped that a wide range of variation would provide an easy classification into clusters indicative of the different strategies available to the farm families. Because of the small range of variation, it was concluded that the cluster analysis was more proficient at determining whether the occupants of a farm were undertaking a resource maximization or time minimization strategy rather than identifying which specific strategy in the model that the farm's occupants had chosen to undertake.

The data from the cluster analysis were used to characterize the variables that composed each cluster, then these data and the characteristics of each individual farm were used to determine the specific strategy of the individual farm's occupants. From the data, it was determined that seven of the eight strategies had been undertaken by various farmstead occupants in the sample. The majority (N = 77) of the farmsteads in the sample were characterized as time minimizers and the remainder (N = 52) were characterized as resource maximizers. Under the time minimization strategy, the majority (N = 35) of the farmstead occupants were further characterized as undertaking a strategy that primarily focused the farmsteads time, energy, and resources at agricultural production. The majority (N = 34) of the resource maximizers had undertaken a strategy where the occupants focused their time, energy, and resources at both agricultural and food production.

The use of categorical data on the occurrence of the different structure and feature types created static entities for which it was assumed there was a continuity in the strategy undertaken at each farmstead through time. To demonstrate the continuity of a strategy undertaken by a farm's occupants, an in depth analysis of the Tipton/Dixon House site in

East Tennessee was conducted. This analysis depicted a farm where the occupants had undertaken a resource maximization strategy that focused simultaneously on agricultural and food production for close to 150 years. The sheer number and diversity of structures and activities areas at this site during this time indicate that the occupants of the site were maximizing returns for both agricultural and food production.

Several questions arise from these results that pertain to the core issues of evolutionary ecology of phenotypic plasticity and human intent: Why was a specific strategy undertaken by the family(ies) that occupied individual farmsteads given the numerous constraints acting on the family? How did the farmstead occupants weigh the costs and benefits for undertaking such a strategy? More importantly, did these families weigh the costs and benefits of their behaviors such that they realized that the strategy that they pursued would have either a positive or negative effect on their long term relative fitness? *The social and environmental constraints acting on a farm family*, which ranged from localized topography that could limit the acreage available for production to cyclical weather patterns, to property ownership, and tenure class, *required a farm family to weigh its options in relation to short-term goals rather than long term relative fitness.* Did a family realize that their short term goals would translate into a long term strategy? *No, the long term results of a specific behavioral strategy are actually the accumulation of the results from short term goals.* Some behaviors, in a post hoc analysis, appear to have been initiated with long term fitness enhancing (or depreciating) goals in mind; however, they too may have been initiated as short term goals and represent the accumulation of results from these short term behaviors. Certain long-term goals, like constructing a barn or making house improvements, were obviously implemented with the intention of having a positive effect on some aspect of the family's life; however, these "improvements" may have had the opposite result of the intended outcome resulting in financial hardships and shortages of needed time, energy, and resources for such things as child growth and development. *The modification of a farm family's behaviors as a result of changing social and ecological environmental constraints, which probably occurred quite frequently, is an example of phenotypic plasticity.* These behavioral modifications may not have long term positive affects on fitness, but appear to be beneficial in the short term.

The "how" behind weighing the costs and benefits of a specific behavior is the most difficult question to address because human behavior will ultimately have a long term affect on fitness. Basically, a family had to address a multitude of questions, such as: Would having a large number of children be beneficial to the family's ability to increase production? Or, would this decision cause an even greater drain on already thin energy and resources? Important here is the role of intent in the decision making process, and what did the person or family intend to do. Did a family intend to have a large number of children to provide a ready labor force, or did a family have fewer children because of limited resources. A family may intend to cultivate more acreage in the long term; however, to achieve this goal they must have a larger labor force which would mean either having more children or hiring more non-kin labor. Either way would require more time, energy, and resources but the latter provides a short term solution, while the former provides a long term solution. In order to accomplish both goals, non-kin labor may be hired in the short term until the family's children are old enough to work on the farm. *These solutions are also based on an individual's or family's perception of short term costs and benefits rather than long term relative fitness decisions.*

The occupants of the Tipton/Dixon House site are an excellent example of the concepts of phenotypic plasticity and human intent that are crucial to evolutionary ecology explanations and provide further insight into the questions and conclusions posed immediately above. During John B. Tipton's early occupation of the Tipton/Dixon House site there are few outbuildings at the site; however, within 10 to 15 years there were numerous outbuildings on the farm's landscape and within a 30 year period Tipton was one of the largest landholders in Monroe County. These factors obviously had an effect on his fitness because he and his wife had 17 children and the family was prominent in Monroe County politics and society. The large Tipton family was a ready labor force; however, none of them were probably old enough to do farm work until the 1830s. It can be assumed that the African-Americans who worked the farm provided all the labor until the children were old enough to help around the farm. It is probably impossible to predict the Tipton family's motivation behind undertaking a resource maximization strategy while others in the Little Tennessee River Valley did not; however, it is obvious that Tipton had social motivations by the time he moved to Monroe County (he was the county's first Circuit Court Clerk). By acquiring large tracts of land (reportedly it took him three days to ride across his property [Sands 1989]) he was solidifying his social position, but at the same time he was preparing what could be considered a "nest egg" for his children following his death. As stated previously, child care is a life-long investment and it seems that Tipton had invested for his children's well-being after his death by purchasing large tracts of land and parsing it out to his children following his death. Tipton also intended to demonstrate his wealth and social status by adding onto his house and changing the facade from the Little Tennessee River, which was the main thoroughfare through Monroe County until a good road system was built in the 1820s, to the well-traveled Morganton Ferry Road that passed in front of his house. He further attempted to convey his wealth and prestige by arranging his outbuildings in such a manner that emulated wealthy farmers in the Southern Coastal Plain. Once the mechanisms were in place at the Tipton/Dixon House site, it seems that the subsequent occupants continued the resource maximization strategy that John B. Tipton and his family had implemented.

WORKS CITED

REFERENCES CITED

Ahlman, Todd M.

1996 Backwards Farmers or Modernizing Farms? The Tennessee Valley Farms of East Tennessee in the Early Twentieth Century. Unpublished M.A. Thesis, Department of Anthropology, University of Tennessee, Knoxville.

1997 Toward an Evolutionary Theory of Early 20th Century Farmsteads: An Example from the Upland South. Paper Presented at the Sixty-second annual meeting of the Society for American Archaeology, Nashville, Tennessee.

1998 A Report on Phase II Archaeological Investigations of 40LD179, The Tipton/Dixon House Site, Loudon County, Tennessee. Department of Anthropology, University of Tennessee, Knoxville, Tennessee.

1999 Archaeological Investigations at the Tipton/Dixon House Site: Deciphering Changing Layouts of an Upland South Farmstead. Paper presented at the Joint Meeting of the Symposium on Ohio Valley Urban and Historic Archaeology and the Conference on Historic Site Archaeology in Illinois, Springfield, Illinois.

2000a Historical Archaeology, Evolutionary Ecology, and Twentieth Century Farmsteads. Paper presented at the Fifty-seventh Southeastern Archaeological Conference, Macon, Georgia.

2000b Historic Period Artifacts and Sites. In Archaeological Reconnaissance Survey of Tennessee Valley Authority Lands on the Watts Bar Reservoir, by Todd M. Ahlman, Susan R. Frankenberg, and Nicholas P. Herrmann, pp. 488-507. Department of Anthropology, University of Tennessee, Knoxville.

Ahlman, Todd M., and Susan R. Frankenberg

1999 Intensive Phase I Archaeological Survey of 23.7 Acres along the Proposed Savannah Harbour at Southwest Point on Watts Bar Lake, Kingston, Roane County, Tennessee. Department of Anthropology, University of Tennessee, Knoxville.

Ahlman, Todd M., Susan R. Frankenberg, and Erin Pritchard

1999 A Report on Phase III Archaeological Investigations at the Tipton/Dixon House Site (40LD179), Loudon County, Tennessee. Department of Anthropology, University of Tennessee, Knoxville.

Ahlman, Todd M., Susan R. Frankenberg, and Nicholas P. Herrmann
2000 Archaeological Reconnaissance Survey of Tennessee Valley Authority Lands on the Watts Bar Reservoir. Department of Anthropology, University of Tennessee, Knoxville.

Avery, Paul G., Timothy E. Baumann, and Charles H. Faulkner
1998 1996 Archaeological Testing at the Ramsey House: Final Report. Prepared for the Tennessee Historical Commission and Association for the Preservation of Tennessee Antiquities: Knoxville Chapter. Department of Anthropology, University of Tennessee, Knoxville.

Bastian, Beverly E.
1988 Historical Archaeological Investigations in Cedar Creek Reservoir, Franklin County, Alabama. *Tennessee Valley Authority Publications in Anthropology* No. 51. Tennessee Valley Authority, Norris.

Bettinger, Robert L.
1991 *Hunter-Gatherers: Archaeological and Evolutionary Theory*. Plenum Press, New York.

Bettinger, Robert L. and Peter J. Richerson
1996 The State of Evolutionary Archaeology: Evolutionary Correctness, or the Search for the Common Ground. In *Darwinian Archaeologies*, edited by Herbert D. G. Maschner, pp. 221-231. Plenum Press, New York.

Bock, W.J.
1959 Preadaptation and Multiple Evolutionary Pathways. *Evolution* 13:41-54.

Boone, James L., and Eric Alden Smith
1998 Is it Evolution Yet?: A Critique of Evolutionary Archaeology. *Current Anthropology* 39:S141-S173.

Boyd, Robert, and Peter J. Richerson
1985 *Culture and the Evolutionary Process*. University of Chicago Press, Chicago.

1992 How Microevolutionary Processes Give Rise to History. In *History and Evolution*, edited by M.H. Nitecki and D.V. Nitecki, pp. 179-209. State University of New York Press, Albany.

Braun, D.P.
1987 Coevolution of Sedentism, Pottery Technology, and Horticulture in Central Michigan, 200 B.C.-A.D. 600. In *Emergent Horticultural Economies of the Eastern Woodlands*, edited by W.F. Keegan, pp. 153-181. Center for Archaeological Investigations, Southern Illinois University at Carbondale, Occasional Paper 7.

Broughton, Jack M., and James F. O'Connell
1999 On Evolutionary Ecology, Selectionist Archaeology, and Behavioral Archaeology. *American Antiquity* 64:153-165.

Cabak, Melanie A. and Mary M. Inkrot
1997 Old Farm, New Farm: An Archaeology of Rural Modernization in the Aiken Plateau, 1875-1950. South Carolina Institute of Archaeology and Anthropology. *Savannah River Research Papers,* 9. Columbia.

Cabak, Melanie A., Mark D. Groover, and Mary M. Inkrot
1999 Rural Modernization During the Recent Past: Farmstead Archaeology in the Aiken Plateau. *Historical Archaeology* 33(4):19-43.

Carnes, Linda F.
1980 A Summary of Historical Archaeological Resources Located within Tellico Industrial Area II. Department of Anthropology, University of Tennessee, Knoxville.

Crass, David Colin, and Mark J. Brooks (editors)
1995 Cotton and Black Draught: Consumer Behavior on a Postbellum Farm. *Savannah River Archaeological Research Papers* 5, Occasional Papers of the Savannah River Archaeological Research Program, South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

Dawkins, R.
1976 *The Selfish Gene.* Oxford University Press, Oxford.

Deetz, James, and Eric Dethlefsen
1965 The Doppler Effect and Archeology: A Consideration of the Spatial Aspects of Seriation. *Southwestern Journal of Anthropology* 21:196-206.

1971 Some Social Aspects of New England Colonial Mortuary Art. In Approaches to the Social Dimension of Mortuary Practice, edited by J. A. Brown, pp. 30-3. *Society for American Anthropology Memoir* No. 25.

Dethlefsen, Eric, and James Deetz

1974 Death's Head, Cherubs, and Willow Trees: Experimental Archaeology in Colonial Cemeteries. *American Antiquity* 31:502-510.

Dunnell, Robert C.

1970 Seriation Method and its Evaluation. *American Antiquity* 35:305-319.

1978 Style and Function: A Fundamental Dichotomy. *American Antiquity* 43:192-202.

1980 Evolutionary Theory and Archaeology. *Advances in Archaeological Method and Theory* 3:35-99.

1986 Methodological Issues in Americanist Artifact Classification. *Advances in Archaeological Method and Theory* 9:149-207.

1989 Aspects of the Application of Evolutionary Theory in Archaeology. In *Archaeological Thought in America*, edited by C.C. Lamberg-Karlovsky, pp. 35-49. Cambridge University Press, Cambridge.

1995 What is it That Actually Evolves? In *Evolutionary Archaeology: Methodological Issues*, edited by Patrice A. Telser, pp. 33- 50. University of Arizona Press, Tucson.

Faulkner, Charles H.

1988 Archaeological Testing at the Nicholas Gibbs House: Season 1. Prepared for the Nicholas Gibbs Historical Society, Knoxville, Tennessee. Department of Anthropology, University of Tennessee, Knoxville.

1989 Archaeological Testing at the Nicholas Gibbs House: Season 2. Prepared for the Nicholas Gibbs Historical Society, Knoxville, Tennessee. Department of Anthropology, University of Tennessee, Knoxville.

1991 Archaeological Testing at the Nicholas Gibbs House: Season 3. Prepared for the Nicholas Gibbs Historical Society, Knoxville, Tennessee. Department of Anthropology, University of Tennessee, Knoxville.

1995 Archaeological Testing at the Ramsey House: Fall 1994. Prepared for the Tennessee Historical Commission and Association for the Preservation of Tennessee Antiquities, Knoxville Chapter. Department of Anthropology, University of Tennessee, Knoxville.

1996 Archaeological Testing at the Ramsey House: 1995 Season. Prepared for the Tennessee Historical Commission and Association for the Preservation of Tennessee Antiquities, Knoxville Chapter. Department of Anthropology, University of Tennessee, Knoxville.

1999 Archaeological Testing at the Ramsey House: 1997 Season. Prepared for the Tennessee Historical Commission and Association for the Preservation of Tennessee Antiquities, Knoxville Chapter. Department of Anthropology, University of Tennessee, Knoxville.

2000 Archaeological Testing at the Ramsey House: 2000 Season. Prepared for the Tennessee Historical Commission and Association for the Preservation of Tennessee Antiquities, Knoxville Chapter. Department of Anthropology, University of Tennessee, Knoxville.

Faulkner, Charles H., and Dalford D. Owens, Jr.

1995 Archaeological Testing of the Ramsey House Barnyard. Prepared for the Tennessee Historical Commission and Association for the Preservation of Tennessee Antiquities, Knoxville Chapter. Department of Anthropology, University of Tennessee, Knoxville.

Frankenberg, Susan R., and Nicholas P. Herrmann

2000 Archaeological Reconnaissance Survey of Tennessee Valley Authority Lands on the Tellico Reservoir. Department of Anthropology, University of Tennessee, Knoxville.

Frankenberg, Susan R., Nicholas P. Herrmann, and Todd M. Ahlman

2000 Archaeological Reconnaissance Survey of Tennessee Valley Authority Lands on the Cherokee Reservoir. Department of Anthropology, University of Tennessee, Knoxville

Franklin, Jay D., and Noeleen McIlvenna

1995a Preliminary Report on Phase II and Intensive Phase II Archaeological Testing of Site 40RE192, State Route 29, Roane County, Tennessee. Transportation Center at the University of Tennessee, Knoxville.

1995b A Preliminary Report on Phase II Archaeological Testing of Sites 40RH115 and 40RH156, State Route 29 (U.S. Route 27), Rhea County, Tennessee. Transportation Center at the University of Tennessee, Knoxville.

Groover, Mark D.
1993 The Upland South Tradition as an Archaeological Model: A Comparison of Sites in Illinois, Tennessee, and South Carolina. *Proceedings of the Conference on Ohio Valley Urban and Historical Archaeology* No. 10, pp. 7-15.

1998 The Gibbs Farmstead: An Archaeological Study of Rural Economy and Material Life in Southern Appalachia, 1790-1920. Unpublished Ph.D. Dissertation, Department of Anthropology, University of Tennessee, Knoxville.

Hames, Raymond
1992 Time Allocation. In *Evolutionary Ecology and Human Behavior*, edited by Bruce Winterhalder and Eric Alden Smith, pp. 203-236. Aldine De Gruyter, Hawthorne, New York.

Hartl, Daniel L., and Andrew G. Clark
1989 *Principles of Population Genetics*, Second Edition. Sinauer Associates, Inc., Sunderland, Massachusetts.

Herrmann, Nicholas P., and Todd M. Ahlman
2000 Historic Period Artifacts and Sites. In Archaeological Reconnaissance Survey of Tennessee Valley Authority Lands on the Melton Hill Reservoir by N.P. Herrmann and S.R. Frankenberg, pp. 261-272. Department of Anthropology, University of Tennessee, Knoxville.

Herrmann, Nicholas P., and Susan R. Frankenberg
2000 Archaeological Reconnaissance Survey of Tennessee Valley Authority Lands on the Melton Hill Reservoir. Department of Anthropology, University of Tennessee, Knoxville.

Hill, M., L.D. Rogers, and M.R. McCorvie
1987 A Thematic Study of Rural Historic Farmsteads, Pope County, Illinois. *Cultural Resources Management Report* No. 118. American Resources Group Ltd., Carbondale, Illinois.

Hendryx, Gregory S.
1998 Limited Data Recovery at the Tapscott-Eason Site (1MG774): A Nineteenth -Twentieth Century Homestead in Morgan County, Alabama. Report for the Tennessee Valley Authority, Norris. University of Alabama Museum, University of Alabama, Moundville.

Jones, George Tom, Robert D. Leonard, and Alysia L. Abbott
1995 The Structure of Selectionist Explanation in Archaeology. In *Evolutionary Archaeology: Methodological Issues*, edited by Patrice A. Teltser, pp. 13-32. University of Arizona Press, Tucson.

Jordan, Terry G.
1967 The Imprint of the Upper and Lower South on Mid-Nineteenth Century Texas. *Annals of the American Association of Geographers* 57:667-690.

Jurney, David.H., and Randall W. Moir (editors)
1987 Historic Buildings, Material Culture, and People of the Prairie Margin. *Richland Creek Technical Series* Volume V, Archaeology Research Program, Institute for the Study of Earth and Man, Dallas, Texas.

Kniffen, Fred
1965 Folk Housing, Key to Diffusion. *Annals of the Association of American Geographers* 55:549-577.

Kniffen, Fred, and Henry Glassie
1966 Building in Wood in the Eastern United States: A Time-Place Perspective. *The Geographical Review* 56:40-66.

Krebs, John R. and Nicholas B. Davies
1997 The Evolution of Behavioral Ecology. In *Behavioral Ecology: An Evolutionary Approach*, Fourth Edition, edited by John R. Krebs and Nicholas B. Davies, pp. 3-12. Blackwell Science Ltd., Oxford.

Leonard, Robert D. and George T. Jones
1987 Elements of an Inclusive Model for Archaeology. *Journal of Archaeological Research* 6:199-219.

Lewontin, Richard C.
1970 The Units of Selection. *Annual Review of Ecology and Systematics* 1:1-18.

1974 *The Genetic Basis of Evolutionary Change*. Columbia University Press, New York.

Leone, Mark P., and Parker B. Potter
1988 Introduction: Issues in Historical Archaeology. In *The Recovery of Meaning: Historical Archaeology in the Eastern United States*, edited by Mark P. Leone and Parker B. Potter, pp. 1- 26. Smithsonian Institution Press, Washington, D.C.

Logan, Michael H., and Hector N. Qirko
1996 An Evolutionary Perspective on Maladaptive Traits and Cultural Conformity. *American Journal of Human Biology* 8:615-629.

Longmire, Charles A.
1996 Archaeological Investigations at Two 19th Century Farmsteads in Rhea and Roane Counties, Tennessee. Unpublished MA Thesis, Department of Anthropology, University of Tennessee, Knoxville.

Longmire, Charles A., and Jay D. Franklin (editors)
1996 A Final Report on Phase II and Intensive Phase II Archaeological Testing on Site 40RE192, Phase II Archaeological Testing on Site 40RH156, and Phase II Archaeological Testing and Phase III Archaeological Data Recovery on Site 40RH156, Rhea and Roane Counties, Tennessee. Transportation Center at the University of Tennessee, Knoxville.

Lyman, R. Lee, and Michael J. O'Brien
1998 The Goals of Evolutionary Archaeology: History and Explanation. *Current Anthropology* 39:615-652.

Machner, Herbert D. G., and Steven Mithen
1996 Darwinian Archaeologies: An Introductory Essay. In *Darwinian Archaeologies*, edited by Herbert D.G. Maschner, pp. 3-14. Plenum Press, New York.

McConkey, Lynn
1998 Personal Communication, Madisonville, Tennessee.

McCorvie, Mary R.
1987 The Davis, Baldridge, and Huggins Sites: Three Nineteenth Century Upland South Farmsteads in Perry County Illinois. Preservation Series 4. American Resources Group Ltd., Carbondale, Illinois.

McCorvie, Mary R., Mark J. Wagner, Jay K. Johnson, Terrance J. Martin, and K.E. Parker
1989 Archaeological Investigations at the Fair View Farm Site: A Historic Farmstead in the Shawnee Hills of Southern Illinois. Cultural Resources Management Report No. 135. American Resources Group Ltd., Carbondale, Illinois.

McKelway, Henry St. Clair
1994 Slaves and Master in the Upland South: Archaeological Investigations at the Mabry Site. Unpublished Ph.D. Dissertation, Department of Anthropology, University of Tennessee, Knoxville.

Moir, Randall W.
1987 Farmstead Proxemics and Intrasite Patterning. In Historic Buildings, Material Culture, and People of the Prairie Margin, edited by D.H. Jurney and R.W. Moir. *Richland Creek Technical Series Volume V*. Archaeological Research Program, Institute for the Study of Earth and Man, Dallas.

Moir, Randall W., and David H. Jurney (editors)
1987 Pioneer Settlers, Tenant Farmers, and Communities. *Richland Creek Technical Series Volume IV*. Archaeological Research Program, Institute for the Study of Earth and Man, Dallas, Texas.

Neff, Hector
1992 Ceramics and Evolution. In *Archaeological Method and Theory*, Vol. 4, edited by M.B. Schiffer, pp. 141-193. University of Arizona Press.

1993 Theory, Sampling, and Technical Studies in Archaeological Ceramic Analysis. *American Antiquity* 58:23-44.

Neiman, Fraser D.
1990 *An Evolutionary Approach to Archaeological Inference: Aspects of Architecture Variation in the 17th-Century Chesapeake.* University Microfilms International, Ann Arbor, Michigan.

Newton Milton B.
1974 Cultural Preadaptation and the Upland South. In *Man and Cultural Heritage: Papers in Honor of Fred B. Kniffen*, edited by H.J. Walker and W.G. Haag, pp. 143-154. *Geoscience and Man*, Volume V. Louisiana State University, Baton Rouge.

O'Brien, Michael J.
1996 The Historical Development of an Evolutionary Archaeology. In *Darwinian Archaeologies*, edited by H.D.G. Mascher, pp. 17-32. Plenum Press, New York.

O'Brien, Michael J., and R. Lee Lyman
2000 Darwinian Evolutionism is Applicable to Historical Archaeology. *International Journal of Historical Archaeology* 4(1):71-112.

O'Brien, Michael J., and Thomas D. Holland

1990 Variation, Selection, and the Archaeological Record. In *Archaeological Method and Theory*, Vol. 2, edited by M.B. Schiffer, pp. 31-79. University of Arizona Press, Tucson.

1992 The Role of Adaptation in Archaeological Explanation. *American Antiquity* 57:36-59.

1995 The Nature and Premise of a Selection-Based Archaeology. In *Evolutionary Archaeology: Methodological Issues*, edited by P.A. Teltser, pp. 175-200. University of Arizona Press, Tucson.

O'Brien, M.J., R.D. Mason, and J.E. Suanders

1982 The Structure of Historic Communities. In *The Cannon Reservoir Human Ecology Project: An Archaeological Study of Cultural Adaptations in the Prairie Peninsula*, edited by M.J. O'Brien, R.E. Warren, and D.E. Lewarch, pp. 125-147. Academic Press, New York.

O'Brien, M.J., T.D. Holland, R.J. Hoard, and G.L. Fox

1994 Evolutionary Implications of Design and Performance Characteristics of Prehistoric Pottery. *Journal of Archaeological Method and Theory* 1:259-304.

Orser, Charles E.

1996 *A Historical Archaeology of the Modern World*. Plenum Press, New York.

O'Shea, John M.

1984 *Mortuary Variability: An Archaeological Investigation.* Academic Press, Inc., Orlando.

Owens, Dalford Dean, Jr.

1996 The Exchange Place: Development of the Commercial Frontier. Unpublished Master's Thesis, Department of Anthropology, University of Tennessee, Knoxville.

1997 Archaeological Testing of the Exchange Place Kitchen. Report prepared for the Exchange Place, Kingsport, Tennessee.

1998 Spatial Distribution of Historic Structures in the Upland South: Analysis and Interpretation. Paper presented at the Southeastern Archaeological Conference, Greenville, South Carolina.

Rencher, Alvin C.
1995 *Methods of Multivariate Analysis.* John Wiley & Sons, Inc., New York.

Rindos, David
1985 Darwinian Selection, Symbolic Variation, and the Evolution of Culture. *Current Anthropology* 26:65-88.

1989 Undirected Variation and the Darwinian Explanation of Cultural Change. *Archaeological Method and Theory* 1:1-45.

Rotenizer, David E.
1992 In the Yard: An Examination of Spatial Organization and Subdivision of Activity Areas on Rural Farmsteads in the Upland South. In Proceedings of the Tenth Symposium on Ohio Valley Urban and Historic Archaeology, edited by A.L. Young and C.H. Faulkner, pp. 1-21. *Tennessee Anthropology Association Miscellaneous Paper* No. 16, Knoxville.

SAS, Inc.
1990 *SAS/STAT User's Guide.* Sas Institute Inc., Cary, North Carolina.

Sands, Sandra G. Cox
1989 *History of Monroe County, Tennessee: From the Western Frontier Days to the Space Age*, Volume III. Gateway Press, Inc., Baltimore.

Schroedl, Gerald F.
1974 Historic Sites Reconnaissance in the Clinch River Breeder Reactor Plant Area. Department of Anthropology, University of Tennessee, Knoxville.

Schiffer, Michael B.
1996 Some Relationships between Behavioral and Evolutionary Archaeologies. *American Antiquity* 62:27-51.

Selby, Warren, Michael J. O'Brien, and Lynn M. Snyder
1984 The Frontier Household. In *Grassland, Forest, and Historical Settlement: An Analysis of Dynamics in Northeast Missouri*, edited by M.J. O'Brien, pp. 87-107. University of Nebraska Press, Lincoln.

Smith, Eric A., and Bruce Winterhalder
1992 Natural Selection and Decision-Making: Some Fundamental Principles. In *Evolutionary Ecology and Human Behavior*, edited by Eric A. Smith and Bruce Winterhalder, pp. 25-60. Aldine de Gruyter, New York.

Spencer, Charles S.
1997 Evolutionary Approaches in Archaeology. *Journal of Anthropological Research* 5:209-264.

Teltser, Patricia A.
1995 Culture History, Evolutionary Theory, and Frequency Seriation. In *Evolutionary Archaeology: Methodological Issues*, edited by P.A. Teltser, pp. 51-68. University of Arizona Press, Tucson.

Tinbergen, N.
1963 On Aims and Methods of Ethology. *Zeitschrift fur Tierpsychologie* 20:404-433.

Turner, Frederick J.
1920 *The Frontier in American History*. Henry Holt Co., New York.

Winterhalder, Bruce, and Eric A. Smith
1992 Evolutionary Ecology and the Social Sciences. In *Evolutionary Ecology and Human Behavior*, edited by Eric A. Smith and Bruce Winterhalder, pp. 3-23. Aldine de Gruyter, New York.

ARCHIVAL SOURCES CITED

Loudon County

var. *Deed Books* 14 (1893), 20 (19090, 37 (1931), 39 (1937), 40 (1939), 75 (1963). Original Documents filed with the Loudon County Clerk's Office, Loudon County Courthouse Annex, Loudon, Tennessee.

var. *Will Books* A and C. Original documents filed with the Loudon County Clerk's Office, Loudon County Courthouse Annex, Loudon, Tennessee.

Monroe County

var. Deed Book A (1822, 1830, 1833, 1840). Original Documents filed with eh Monroe County Clerk's Office, Monroe County Courthouse, Madisonville, Tennessee.

United States Bureau of the Census (USAC)

1850 *Production of Agriculture, Schedule 4*, Monroe County, Tennessee. Microfilm filed at Hodges Library, University of Tennessee, Knoxville.

1860 *Production of Agriculture, Schedule 5*, Monroe County, Tennessee. Microfilm filed at Hodges Library, University of Tennessee, Knoxville.

1870 *Production of Agriculture, Schedule 6*, Monroe County, Tennessee. Microfilm filed at Hodges Library, University of Tennessee, Knoxville.

1880 *Production of Agriculture, Schedule 7*, Monroe County, Tennessee. Microfilm filed at Hodges Library, University of Tennessee, Knoxville.

United States Bureau of the Census (USSC)

1860 *The Eighth Census of Population, Slave Schedules, Monroe County, Tennessee*. Microfilm filed at Hodges Library, University of Tennessee, Knoxville.

United States Bureau of the Census (USPC)

1900 *The Twelfth Census of Population, Loudon County, Tennessee*. Microfilm filed at Hodges Library, University of Tennessee, Knoxville.

1920 *The Thirteenth Census of Population, Loudon County, Tennessee*. Microfilm filed at Hodges Library, University of Tennessee, Knoxville.

APPENDIX

Site Name	Site No	Strategy	Strategy Set	Cluster	Location	tenure class	Reference	Initial Occupation	Terminal Occupation	Dwelling	barn	crib	hog house	chicken house	shed	Spring house/well house	smoke house/ meat house	Wood shed	Food storage	well/ cistern	privy	silo	Agricultural processing	garage/Machine Shed	Total
	40MG230	R	1	1	TN	tenant			1941	1	1	0	0	0	1	0	1	0	1	1	0	0	1	1	
[illegible] House	40RH208	R	1	1	TN	operator	Ahlman 1996	1820	1941	1	2	1	0	2	1	0	1	0	2	2	1	0	1	2	1
Ramsey House	40KN120	R	1	1	TN	owner/tenant	Faulkner 1995 1998, 2000 Faulkner and Owens 1995	1798	1970	1	3	0	0	0	1	0	2	0	1	2	1	0	1	0	1
	40RE261	R	1	2	TN	operator			1941	1	1	0	1	2	1	0	1	0	0	3	1	1	0	1	1
	40RH216/ 217	R	1	2	TN	operator	Ahlman 1996	1870	1941	1	1	0	1	4	1	0	1	1	1	1	1	2	0	3	1
	40MR619	R	1	2	TN		Frankenberg et al 2000		1969	1	1	0	1	0	1	2	1	0	0	0	0	2	0	1	1
Exchange Place	Exchange	R	1	3	TN	owner/tenant	Owens 1996, 1998	1820	1971	1	1	3	0	0	0	1	2	0	0	0	0	0	0	0	
The Old Jim McMurray Place	1FR297	R	1	3	AL		Bastian 1988		1976	1	1	0	0	1	2	1	1	0	0	0	1	0	0	1	
Ellis Hendrix Place	1FR295	R	1	3	AL		Bastian 1988	1870	1976	2	2	1	0	0	0	1	0	0	0	0	0	0	0	0	
Alfred Thorn Cabin	1FR292	R	1	3	AL		Bastian 1988	1860	1976	1	2	1	0	1	2	2	1	0	0	0	0	0	0	0	1
Gibbs Site	Gibbs	R	1	3	TN	owner/tenant	Groover 1998	1792	1986	1	2	2	0	0	0	1	1	1	0	0	0	0	0	0	
	40LD326	R	1	3	TN		Frankenberg et al 2000		1969	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	
	40MG225	R	1	4	TN	tenant			1941	1	2	0	0	2	1	0	1	1	1	1	1	0	0	0	1
	40RE212	R	1	4	TN	tenant			1941	1	1	0	1	1	0	0	1	0	1	1	1	0	0	0	
Fair View Farm Site	11SA336	R	1	4	IL	owner/tenant	McCorvie et al 1989	1850	1936	1	1	1	0	1	0	0	1	0	3	3	1	0	0	0	1
Tipton/Dixon House Site	40LD179	R	1	5	TN	owner/tenant	Ahlman 1998/ Ahlman et al 1999	1819	1969	1	2	1	1	1	0	1	2	0	1	1	2	2	1	1	1
	40MG224	R	1	6	TN	tenant			1941	1	2	0	0	1	1	0	1	1	0	1	1	0	0	1	
	40MG271	R	1	6	TN	tenant			1941	1	1	2	1	5	1	0	2	1	0	1	1	0	0	0	1
	40RH206	R	1	6	TN	tenant			1941	1	1	0	0	1	0	0	1	0	0	1	1	0	0	1	
	40MR669	R	1	6	TN		Frankenberg et al 2000		1969	1	1	1	0	1	0	0	1	0	0	1	1	0	0	1	
	40MG241	R	1	6	TN	Owner			1941	1	1	1	0	0	0	0	1	1	0	1	1	0	0	1	
	40RE489	R	1	6	TN	tenant			1941	1	1	1	2	1	0	0	1	1	0	1	2	0	0	2	1
	40RE277	R	1	6	TN	tenant			1941	1	1	0	2	1	1	0	1	0	0	2	1	0	0	0	1
	40RE445	R	1	6	TN	tenant			1941	1	1	1	0	0	0	0	1	1	0	0	1	0	0	0	
	40HW123	R	1	6	TN		Frankenberg and Herrmann 2000		1941	1	1	1	0	0	4	0	1	0	1	1	1	0	0	0	1
	40HB46	R	1	6	TN		Frankenberg and Herrmann 2000		1941	1	2	0	0	1	0	0	1	0	0	2	1	0	0	0	
	40GR168	R	1	6	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	0	0	1	1	0	1	0	0	0	0	
	40GR181	R	1	6	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	1	0	1	0	0	2	1	0	0	1	
	40RE270	R	1	7	TN	tenant			1941	1	2	0	0	0	2	0	1	0	0	0	1	0	0	0	
	40HW105	R	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	1	0	0	4	0	1	0	0	1	1	0	0	0	1
	40GR96	R	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	1	0	1	1	0	1	0	0	1	0	0	0	0	
	40HW140	R	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	1	0	0	4	0	1	0	0	0	0	0	0	0	
	40HB60	R	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	1	0	1	3	0	1	0	0	0	1	0	0	0	
	40HB64	R	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	2	1	0	1	0	0	1	1	0	0	0	
Bowman House	40LD232	R	2	2	TN	owner/tenant	Owens et al 1997	1819	1969	1	2	0	0	1	4	1	0	0	0	0	3	0	1	0	1
	40RE121	R	2	3	TN		Schroedl 1974		1940	1	2	0	0	1	4	1	1	0	0	0	0	0	0	0	1
	40RE122	R	2	3	TN		Schroedl 1974		1940	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0	
	40MR565	R	2	3	TN		Frankenberg et al 2000		1969	1	1	0	0	1	2	1	0	0	0	0	0	0	0	0	
	40RH218	R	2	4	TN	tenant	Ahlman 1996	1870	1941	1	1	0	0	2	0	0	1	1	0	1	1	0	0	2	
	40RH211	R	2	4	TN	tenant			1941	1	1	1	0	1	0	0	1	1	1	1	1	0	0	0	
Jimmy Massey Cabin	1FR293	R	2	7	AL		Bastian 1988	1870	1976	1	1	0	0	1	3	0	0	0	0	0	0	0	0	2	
	40KN156	R	2	7	TN		Herrmann and Frankenberg 2000		1963	1	3	0	0	0	1	0	0	0	0	1	1	0	0	2	
	40KN175/ 161	R	2	7	TN		Herrmann and Frankenberg 2000		1963	1	2	1	0	1	0	0	0	0	0	1	1	0	0	0	
	40MR559	R	2	7	TN		Frankenberg et al 2000		1969	1	2	0	0	1	2	0	0	0	0	1	0	0	0	0	
	40MR550	R	2	7	TN		Frankenberg et al 2000		1969	1	2	0	0	0	3	0	1	0	0	0	0	0	0	0	
	40HW109	R	2	7	TN		Frankenberg and Herrmann 2000		1941	1	2	2	0	0	2	0	0	0	0	0	2	0	0	0	
	40RE392	R	2	6	TN	operator			1941	1	2	1	1	1	0	0	1	0	0	0	1	0	0	0	
	40RE182	R	2	6	TN	tenant	Ahlman and Frankenberg 1996	1807	1941	1	2	1	0	1	0	0	0	0	0	0	1	0	1	1	
	40LD332	R	2	6	TN		Frankenberg et al 2000		1969	1	2	2	0	1	2	0	1	0	0	0	1	0	0	1	1
Dave Site		R	3	1	IL	owner/tenant	McCorvie 1987	1840	1885	1	0	0	0	0	0	0	1	0	1	3	0	0	1	0	
Huggins Site		R	3	1	IL	owner/tenant	McCorvie 1987	1828	1960	1	0	0	0	0	0	0	3	0	2	4	0	0	3	0	1
	40HW120	R	3	3	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	0	3	1	1	0	0	0	0	0	0	0	
	40RH199	T	1	7	TN	tenant			1941	1	1	0	0	0	0	0	1	0	0	2	1	0	0	0	
	38BR629	T	1	7	SC	owner/tenant	Crass and Brooks 1996	1890	1951	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	
	40MR577	T	1	7	TN		Frankenberg et al 2000		1969	1	1	0	0	1	1	0	1	0	1	1	0	0	0	0	
	40LD303	T	1	7	TN		Frankenberg et al 2000		1969	1	1	0	0	1	1	0	1	0	1	0	0	0	1	1	
	40LD271	T	1	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0	
	40GR88	T	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	1	0	1	0	0	1	1	0	0	0	
	40GR87	T	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	1	0	1	0	0	1	0	0	1	1	0	0	0	
	40GR89	T	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	0	0	1	0	0	1	1	0	0	0	
	40GR10	T	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	0	0	1	0	0	2	0	0	0	0	
	40GR107	T	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	2	0	1	0	0	0	0	0	0	0	
	40GR156	T	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	
	40GR176	T	1	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0	
	40HB101	T	1	7	TN		Ahlman 2000	1936	1941	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0	
	40MG246	T	2	7	TN	tenant			1941	1	1	1	0	0	0	0	1	0	0	1	1	0	0	0	
	40MG223	T	2	7	TN	tenant			1941	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0	
	40MG226	T	2	7	TN	tenant			1941	1	0	0	1	0	0	0	1	0	0	0	1	0	0	0	
	40RE233	T	2	7	TN	tenant			1941	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0	
	40RE217	T	2	7	TN	tenant			1941	1	0	0	0	1	0	0	1	0	0	0	1	0	0	0	
	40RE215	T	2	7	TN	tenant			1941	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	
	40EW262	T	2	7	TN	tenant			1941	1	1	0	0	0	1	0	1	0	0	0	1	0	0	0	
	40RE372	T	2	7	TN	tenant			1941	1	1	1	0	2	0	0	1	0	0	0	1	0	0	0	
	40RH204	T	2	7	TN	tenant			1941	1	0	1	0	0	0	0	1	0	0	0	1	0	0	0	
	40RE254	T	2	7	TN	tenant			1941	1	1	1	0	0	0	0	1	0	0	0	1	0	0	0	
David Langley Cabin Site	1FR296	T	2	7	AL		Bastian 1988	1850	1976	1	1	2	0	0	0	0	1	0	0	0	0	0	0	0	
Willie Floyd Farm	38BR619	T	2	7	SC	owner/tenant	Crass and Brooks 1996	1890	1951	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0	
Tapscott-Eason Site	1MG774	T	2	7	AL	owner/tenant	Hendryx 1996	1900	1958	1	2	0	0	0	1	0	1	0	0	0	1	0	0	0	
	40RE120	T	2	7	TN		Schroedl 1974		1940	1	2	0	0	0	2	0	1	0	0	1	0	0	0	0	
	40RE123	T	2	7	TN		Schroedl 1974		1940	1	1	1	0	0	1	0	1	1	0	1	0	0	0	0	
	40KN173	T	2	7	TN		Herrmann and Frankenberg 2000		1963	1	1	0	0	0	3	0	0	0	0	0	1	0	0	0	
	40MR676	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	2	0	1	0	0	1	0	0	0	0	
	40MR681	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
	40MR615	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	2	0	1	0	0	0	0	0	0	0	
	40MR560	T	2	7	TN		Frankenberg et al 2000		1969	1	1	1	0	0	0	0	0	0	0	1	0	0	0	1	
	40LD338	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	3	0	0	0	0	0	0	0	0	0	
	40LD336	T	2	7	TN		Frankenberg et al 2000	1828	1969	1	1	0	0	0	2	0	1	0	0	1	0	0	0	0	
	40LD318	T	2	7	TN		Frankenberg et al 2000		1969	1	0	0	0	0	2	0	0	0	0	0	0	0	1	0	

	40LD302	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	2	0	0	0	0	1	0	0	0	0
	40LD295	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	1	0	0	0	0	1	1	0	0	0
	40LD278	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	40LD275	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	40LD269	T	2	7	TN		Frankenberg et al 2000		1969	1	1	0	0	0	1	0	0	0	0	0	0	0	0	1
	40HW100	T	2	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	40GR86	T	2	7	TN		Frankenberg and Herrmann 2000		1941	1	2	1	0	1	0	0	1	0	0	0	0	0	0	0
	40GR90	T	2	7	TN		Frankenberg and Herrmann 2000		1941	1	2	1	0	1	0	0	0	0	0	0	0	0	0	0
	40GR113	T	2	7	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	40GR162	T	2	7	TN		Frankenberg and Herrmann 2000		1941	1	1	1	0	0	0	0	0	0	0	1	1	0	0	0
	40HB90	T	2	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	0	0	0	0	0	1	0	0	0	0
	40HB83	T	2	7	TN		Frankenberg and Herrmann 2000		1941	1	1	0	0	1	0	0	0	0	0	0	1	0	0	0
	40RH156	T	3	7	TN	owner/tenant	Longmire 1996	1830	1920	1	1	0	0	0	1	0	1	0	0	0	0	0	0	0
	40MGZ27	T	3	7	TN	tenant			1941	1	1	0	0	1	0	0	1	0	0	0	0	0	0	0
	40RE216	T	3	7	TN	Owner			1941	1	0	0	0	0	0	0	1	0	0	1	1	0	0	0
	40RE208	T	3	7	TN	tenant			1941	1	0	0	0	2	0	0	1	0	0	0	1	0	0	0
	40RE253	T	3	7	TN	tenant			1941	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0
	40RH210	T	3	7	TN	tenant			1941	1	0	0	0	1	0	0	1	0	0	1	1	0	0	0
	40RH202	T	3	7	TN	tenant			1941	1	0	0	0	1	0	0	1	0	0	1	1	0	0	0
	40RE474	T	3	7	TN	tenant			1941	1	0	0	0	1	0	0	0	0	0	0	1	0	0	0
	40MR593	T	3	7	TN		Frankenberg et al 2000		1969	1	0	0	0	0	1	0	1	0	0	1	0	0	0	2
	40LD310	T	3	7	TN		Frankenberg et al 2000		1969	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0
	40LD296	T	3	7	TN		Frankenberg et al 2000		1969	1	0	0	0	1	2	0	1	0	0	0	1	0	0	0
	99-101	T	3	7	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	1	1	0	0	0	0	1	0	0	0	0
	40HW191	T	3	7	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	0	1	0	1	0	0	0	0	0	0	0
	40GR153	T	3	7	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	40MR607	T	4	3	TN		Frankenberg et al 2000		1969	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0
	40LD330	T	4	7	TN		Frankenberg et al 2000		1969	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	40RH200	T	4	7	TN	tenant			1941	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	40RE475	T	4	7	TN	tenant			1941	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	40RE308	T	4	7	TN	tenant			1941	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	40RE251	T	4	7	TN	tenant			1941	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	40RE192	T	4	7	TN	tenant	Longmire 1996	1820	1840	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	38BR522	T	4	7	SC	owner/tenant	Crass and Brooks 1996	1890	1935	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	40MR632	T	4	7	TN		Frankenberg et al 2000		1969	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	40 MR629	T	4	7	TN		Frankenberg et al 2000		1969	1	0	0	0	0	2	0	0	0	0	0	0	0	0	0
	40MR576	T	4	7	TN		Frankenberg et al 2000		1969	1	0	0	0	0	1	0	0	0	0	0	1	0	0	0
	40GR85	T	4	7	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
	40HB61	T	4	7	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0
	40HB83	T	4	7	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	40GR181	T	4	7	TN		Frankenberg and Herrmann 2000		1941	1	0	0	0	0	0	0	0	0	0	1	1	0	0	0

VITA

Todd M. Ahlman was born in Valentine, Nebraska and spent the majority of his formative years growing up in northeast Nebraska in the town of Wausa. During his childhood a glimpse of the future could be see in his fascination with old broken plates and bottles at the farm where he grew up. After graduating from Wausa Public School he continued his education at the University of Nebraska, majoring in Anthropology. As an undergraduate student, Todd's interests in archaeology were in prehistoric lithic analysis. In 1991 he graduated from the University of Nebraska and took a position doing field and laboratory work for the National Park Service, Midwest Archaeological Center in Lincoln, Nebraska. It was there that his interest in historical archaeology blossomed. After a couple years (and the threat of being laid off if he did not go to graduate school), Todd ventured south to the University of Tennessee to get a master's degree in Anthropology. In the summer of 1996 he accomplished this feat, much to the surprise of many. When he started graduate school, Todd only intended to complete a master's degree; however, in 1996 he decided to continue his education and attempt to get a doctoral degree from the University of Tennessee. Some four years and $30,000 later, this dissertation represents the culmination of these efforts.