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Social Status, Stature, and Pathology at Chucalissa (40SY1), Shelby County, Tennessee

Ronald K. Robinson
University of Tennessee, Knoxville

To the Graduate Council:

I am submitting herewith a thesis written by Ronald K. Robinson entitled "Social Status, Stature, and Pathology at Chucalissa (40SY1), Shelby County, Tennessee." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Anthropology.

William M. Bass, Major Professor

We have read this thesis and recommend its acceptance:

Fred H. Smith, Avery Henderson

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

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

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Vice Chancellor
Graduate Studies and Research

SOCIAL STATUS, STATURE, AND PATHOLOGY AT CHUCALISSA (40SY1), SHELBY COUNTY, TENNESSEE

A Thesis
Presented for the
Master of Arts
Degree
The University of Tennessee, Knoxville

Ronald K. Robinson

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ABSTRACT

Ethnohistoric and archaeological models have been used in making inferences about social interaction and relationships in Mississippian societies. In spite of an increasing awareness of cultural and biological interrelationships in approaching prehistoric societies, there remains a general lack of skeletal studies which have contributed to or supported these inferences.

The purpose of this investigation was to test the hypothesis that socially regulated or defined differences between groups of individuals existed at Chucalissa (40SY1), incorporating both archaeological and skeletal data. The ethnohistoric model of the Natchez social system and Ford's (1974:406) generalization that Mississippian societies were highly stratified due to a redistributional economy were evaluated for their applicability to Chucalissa.

The sample consisted of 162 individuals, for which there were skeletal remains or recorded burial information. Most burials were thought to be Late Mississippian.

Working from the assumption that differential burial treatment relays social meaning, burial data were examined for clues to social interaction and status. Stature and general pathological conditions were considered as their distributions have been attributed to the effects of social interaction or status.

No apparent differences were found between residential units to suggest that they may have represented distinct social units. However, high status was inferred for the individuals of the burial mound because of their unique grave associations and the variability encountered among burial attributes. The high percentages of nonspecific inflammation of the appendicular skeleton, degenerative joint disease, and healed fractures found among these individuals may have been related to activities of acquiring or maintaining this high status. The tallest males and females were found in this burial mound.

The distribution of pottery suggests that status may have been acquired at birth, but full social position was probably not realized until one reached adult status. The greater variability in burial attributes among subadults implies their tenuous social position. The high frequency of pottery among females and the high percentage of degenerative changes affecting synovial joints and healed fractures among males suggest that the major social distinction between males and females may have been a division of labor.

From these results, it was concluded that neither the model of the Natchez social system nor Ford's (1974:406) generalization that Mississippian societies were highly stratified due to a redistributional economy offered adequate interpretations of the data from Chucalissa.

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INTRODUCTION

Ethnohistoric and archaeological models have been used in making inferences about social interaction and relationships within Mississippian societies. In spite of an increasing awareness of the importance for considering cultural and biological interrelationships in approaching prehistoric societies, there remains a general lack of skeletal studies which have contributed to or supported interpretations of social interaction and relationships. This may be due to a number of factors, including the failure of archaeologists and physical anthropologists to exchange their data, deficient or inadequate skeletal samples, or lack of a method for incorporating data derived from skeletal material into interpretations about social interaction and relationships in prehistoric societies.

The present investigation examines both archaeological and skeletal data to infer social relationships and status at Chucalissa (40SY1), a Mississippian site located in southwestern Tennessee. Burial data, stature, and pathology are considered as they may contribute to delineate social groups at Chucalissa. The application of ethnohistoric and archaeological models to Chucalissa are then evaluated in light of the results.

CHAPTER I

LITERATURE REVIEW

Ethnohistoric Considerations

Data from ethnohistoric groups such as the Natchez have been used to describe the social structure of Mississippian societies (Dragoo 1976:20). The traditional source on the Natchez social organization has been Swanton (1911). Swanton drew from the early French accounts of the Natchez to derive his model of their social organization. His model consisted of a four class system. The nobility or upper class was further subdivided into three classes--the Suns or ruling class, the Nobles, and the Honoreds, while the lower class was made up of commoners. According to this model, the three classes of nobility were exogamous. Members of each noble class were required to marry into a lower class, though commoners could presumably marry into their own class. Status degeneration occurred through the male line, while the nobility was perpetuated through the female line. Two different descent principles were operating in the same system. One was matrilineal descent, but the other was unusual in that a child took the immediate rank below his father. A child's rank was determined by the rank of the highest ranking parent. If the highest ranking parent was the mother, the child assumed the rank of the mother. If the highest ranking parent was the father, the child took the rank immediately below the father. Rank was based only on descent.

This model has been criticized on several grounds. The social system as proposed by Swanton (1911) is a biological impossibility (Hart 1943). If the nobility were required to marry into a lower class, the number of Nobles and Honoreds would have increased in successive generations where ultimately the commoners would be unable to provide spouses for all members of the nobility, and would eventually become extinct.

There is a problem in defining rules of descent from Swanton's model. Tooker (1963) suggests that the Natchez society was composed of matrilineal clans rather than exogamous classes, as proposed by Swanton. The Suns were only a clan from which the leader of the nation was chosen, while the rank of the remainder of the society rested on both inheritance and achievement. Status may have been achieved and ascribed. Commoners could have elevated themselves through war exploits or sacrificial rituals.

There is some question as to whether the Nobles and Honoreds of Swanton's model were actually exogamous classes or merely pretigious positions. White, Murdock and Scaglion (1971) suggest that Swanton's four class system is inconsistent with the original sources, and a two class system of nobility and commoners is more plausible. The Suns were not a social class, but a familial group. Suns and Honoreds constituted political ranks. The royal family was reckoned through genealogical nearness to the chief, though descent for the nobility was assymetric. There were different rules of descent for males and females of the nobility.

Due to the ambiguity of early historic accounts, there is general disagreement in defining the Natchez social structure and its rules of descent. Three different views of the Natchez social system have been discussed. The model proposed by Swanton (1911) is a four class system with an exogamous nobility and with two different descent principles allowing status degeneration to occur among males. Tooker (1963) has criticized this model and suggests that the Natchez society was composed of matrilineal clans. The Suns were a clan from which the leaders of the Natchez nation were chosen. Rank and status for the rest of the society may have been ascribed and achieved. White, Murdock and Scaglion (1971) proposed that the Natchez social structure was composed of two classes--the nobility and the commoners. The Sun class, as originally defined by Swanton, is not a class, but a familial group. Suns and Honoreds are political ranks, rather than classes. They suggest an assymetric descent principle for males and females of the nobility.

Archaeological Considerations

Burials offer unique opportunities for interpreting and understanding social interaction and status in prehistoric communities (Binford 1964). They are potential sources of information about social structure. Binford (1971) maintains that an explicit relationship between the complexity of the status structure and the complexity of mortuary ceremonialism in a social system exists.

The assumption that differential burial treatment has social meaning finds its justification in the ethnological analysis of burial customs (Binford 1971). In every social system there are behavioral sets known as social identities. A composite of these social identities maintained by an individual during life is referred to as that individual's social persona. Disposal of the dead in any system of mortuary treatment is regulated by social considerations surrounding (1) the social persona of the deceased and (2) the recognition and formalization of the individual's various roles and statuses by the social group.

The use of burial data to reconstruct and infer modes of social stratification within Mississippian communities has been demonstrated by Binford (1964), Larson (1971), Peebles (1971), and Hatch (1975). Distinctions of social status have been inferred from burial style, burial location, and grave associations. High social status has been conferred to burials in or near platform mounds. These high status burials were often accompanied by artifacts ascribed special importance. Extensive trade networks throughout the Southeastern United States during the Mississippian period allowed each community to participate in a symbolic universe or "cult" that resulted in the burial of similar artifacts with important persons (Waring and Holder 1945). Brown (1971) found these communalities among burials of the Mississippian centers of Etowah and Moundville. Hatch (1975) also found these applicable to a large burial sample from the Dallas society.

Excavations of Mound C burials at Etowah suggested social ranking within the resident population during the Mississippian period (Larson 1971). Following Waring and Holder (1945), Larson recognized two distinct categories of grave associations--(1) ornaments worn as part of a costume and (2) weapons. Grave goods occurred rarely in village burials, but when present consisted of either a stone celt or pottery vessel of the domestic variety. The distribution of artifacts allowed further observations and inferences. Not everyone at Etowah was accorded the same burial treatment. Exotic or "cult" artifacts present in mound burials were absent from village burials. Burial in Mound C seemed to preclude any distinction as to age, sex, or occupation. This small segment of the population probably represented a descent group, among whose privileges, by virtue of their superordinate position, included this special burial locale and ritual paraphenalia and costume.

Peebles (1971) inferred that a ranked society existed at Moundville by demonstrating similarities and differences in burial status among individuals within the regional center at Moundville and within smaller local centers and local communities. Social ranking was revealed by the distribution of local symbols, which were bird sternum gorgets, and supralocal symbols, which included shell gorgets and "cult" artifacts. Social stratification was suggested from mound and cemetery burial, from the restriction of supralocal symbols to mounds and local symbols to cemeteries, and from the distribution of local symbols within cemeteries. The occurrence of shell gorgets and "cult" artifacts, symbolic of high status, was limited to a restricted number of individuals buried in platform mounds.

Hatch (1975) has suggested that the covariation of artifact types and their intra- and inter-site distributions indicated that social status differentials existed in the Dallas society. Utilitarian artifacts were more frequent in village areas and partitioned this segment of the population on age and sex. Non-utilitarian artifacts, while restricted to females and subadults of the village group, accompanied all ages and both sexes of the mound group. Not all individuals in the Dallas society were given the same burial style. Mound burial was generally for a restricted segment of the population. This group possessed the greatest number and variety and the most exotic artifacts. Because all ages and both sexes were accorded this high burial status, accessibility to these positions was probably based on a limited number of ascriptive statuses attained throughout life.

The general model of a chiefdom has been used to generate hypotheses for further interpretation of the variety of status distinctions within Mississippian societies (Peebles 1971; Hatch 1975). The rise of the chiefdom seems to have been related to an environmental pattern which was selective for specialization in production and redistribution (Service 1962:143-144). In this type of society distinctions in social status are based on economic differences, by which certain members of a society enjoy differential rights of access to basic resources (Fried 1967). With regard to this model, Ford (1974:406) has suggested that highly stratified societies, based on a system of redistribution, evolved from the agricultural base of the Mississippian period.

Biological Considerations

Social stratification is not merely a cultural phenomenon, but is founded in the interaction of biological and cultural factors. Every person in a society has a position as a result of birth, age, sex, or occupation. Social status differentiation based on age or sex seems to be universal. Age and sex have been made into social categories by the addition of attributes which go along with ascribed codes of conduct in interpersonal relations

(Service 1962:193). Social identity may be made through biological distance; social interaction may be contingent upon biological kinship; status with a group may be based upon physical attributes or inheritance; or the right to burial in an exclusive or restricted cemetery may hinge upon biological kinship.

Skeletal remains from burials can also serve to define various social relationships within prehistoric societies. Data on demography, stature, and pathology of skeletal populations are potential sources of information about social organization and status (Saul 1972). The distributions of injury and pathology may be associated with distinctions in social status (Willey 1973). The approach to paleopathology adopted by Roney (1966) deals with patterns of diseases in populations, taking into account both archaeological and skeletal documentation.

Stature has been identified as a possible correlate of social status (Haviland 1967; Buikstra 1972; Willey 1973). Buikstra (1972) has offered two explanatory models for this possible relationship. (1) In societies in which social status is achieved, social units may choose leaders for their special mental or physical attributes. (2) In societies in which status is ascribed, social positions are attained by birthright and imply some genetic link between high status individuals.

Stature is produced by a combination of environmental and genetic factors. Though stature is thought to be more responsive to the environment (Saul 1972:29-30), the exact cause of the variation in stature is difficult to pinpoint because of its polygenic nature. Variation may be due to (1) age, (2) sex, (3) ethnic distribution (Krogman 1962: 185), (4) variation in diet, (5) illness (Kallen 1971), or (6) inbreeding (Schrieder 1967; Strouhal 1971). With regard to the two models given in Buikstra (1972), the distribution of stature may be influenced by social stratification, even though the individual expression of stature may be determined by a number of factors.

Willey (1973) and Hatch and Willey (1974) suggested that stature differences in the Dallas society may have been linked to social stratification. High status in Mississippian societies has been associated with mound burial and the presence of exotic or "cult" artifacts. Among Dallas burials they have shown a significant association ($P < .01$) between tall males and "cult" artifacts. They also found location in or near mounds to be significantly associated ($P < .01$) with tall males. On the basis of these stature distributions, Willey suggested that status was partially inherited in the Dallas society.

Pathology has been an important selective factor in the composition of human skeletal populations, not only from the standpoint that skeletal material has often been collected for its pathological conditions, but also from the point of view that not everyone dies of old age (Stewart 1969). Many diseases though do not involve changes in the bone; others are of such a non-specific nature that diagnosis is severely hindered. Therefore, observations of disease in human skeletal populations are necessarily restricted to generalized pathological conditions. While not covering the specific nature of disease, distributions of generalized pathological conditions may reveal differential patterns of disease when taken in a social context.

There is a close interrelationship between culture and disease ecology (May 1960; Dubos 1968). Separating the consequences of disease and the consequences of social factors associated with disease is complicated by behavioral factors relating to age, sex, occupation, or social and economic status. Certain situations in social patterns may create stress or disease stimuli within human populations. Differential disease distributions may reveal information about the impact of some segments or groups of a population upon other segments or groups of the same population. Montgomery (1973) has noted the probable relationship between disease distributions and social and economic status. Among the biological and cultural factors affecting the patterns of infectious disease are the arrangement of living space, the social isolation of various groups or subgroups, class differentiation, and patterns of social interaction within communities (Alland 1970:52-55). Social status may play an important role in the access, selection, and distribution of food. Davies (1963) has identified these factors and has stressed their importance in evaluating the epidemiology of oral disease. Dahlberg (1969:43) has noted that dental paleopathology is helpful in evaluating environmental and cultural influences affecting the dentition in prehistoric populations.

Much of the infectious disease that afflicts man probably came into being during the course of his biological and cultural evolution. The pattern and incidence of infectious disease depends upon the interaction of man and his environment, including his cultural environment. Culture can inhibit the transmission of disease, or influence its distribution. Shifts in technology, social organization, and ideology can influence the incidence of infectious disease. Social interaction and contact is crucial to the spread of infectious disease within human populations.

Nutritional diseases are generally confined to a specific segment or segments of a population (Clements 1970; Kallen 1971). Poor nutrition is not randomly distributed in a social system, but is influenced by various social and economic factors. Poor nutrition may exaggerate the effects of infectious disease.

CHAPTER II

STATEMENT OF THE PROBLEM

Buikstra (1972) and Hatch and Willey (1974) have illustrated the desirability of investigation which incorporates both burial and biological data. An investigation integrating archaeological data from burials and data derived from skeletal material may elucidate cultural and biological relationships within Mississippian societies. The present investigation deals with the integration of archaeological data and data derived from skeletal remains to test the hypothesis that there were socially regulated or defined differences between groups of individuals at Chucalissa (40SY1), a Mississippian site in southwestern Tennessee (Figure 1). This is accomplished by using burial data to infer modes of social stratification and social status, examining the distribution of stature, and identifying pathologies, whose distributions may be attributed to social status or social interaction. Burial data, stature, and pathology are considered as they may contribute to the delineation of groups of individuals at Chucalissa. Predictive aspects of the Natchez model and Ford's (1974:406) generalization about Mississippian societies are evaluated as they apply to Chucalissa.

The plausibility that status distinctions existed at Chucalissa is suggested by the distribution of pottery.

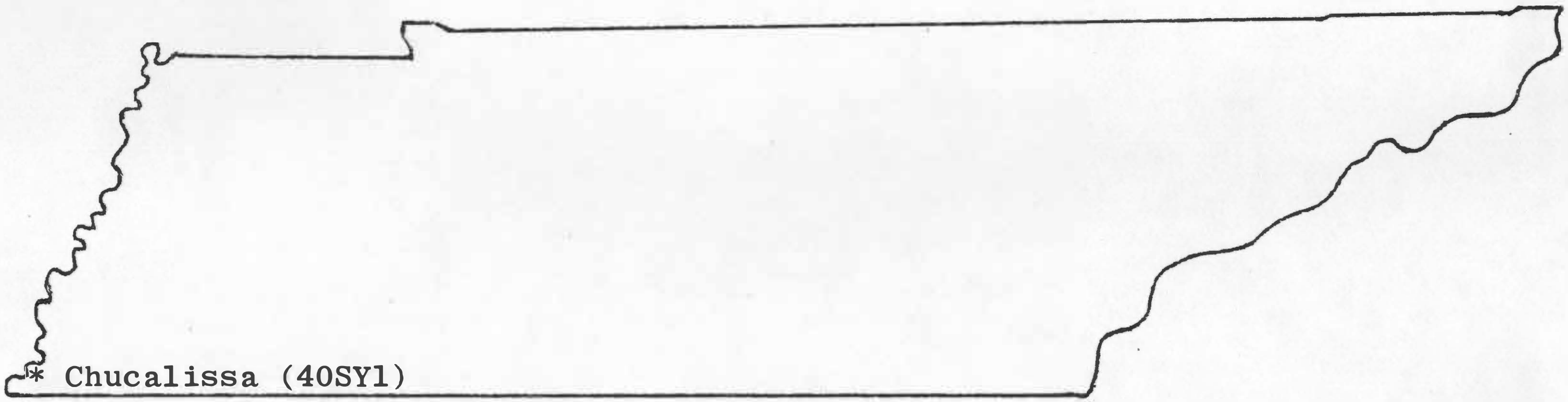

Figure 1. Outline map of Tennessee showing the location of Chucalissa (40SY1).

Decorated pottery is more common from the platform mound and the area surrounding the plaza than other village areas (Smith 1973). Moreover, status differentiation is indicated by the excavated units within the site. The location of village units are separated from the residential ridge encircling the plaza. This ridge seems to have been the residence of high status individuals and families, while the village units were occupied by the families of low status individuals (Nash 1955; Nash and Gates 1962). Similarly, one might anticipate that distinctions in social status would also be exhibited among burial attributes, as burials of these respective groups remained associated with residence (Nash 1972:13).

The model of the Natchez social system has been used to describe the pattern of social organization at Chucalissa (Nash and Gates 1962). If the application of this model to Chucalissa is valid, then one should be able to make predictive statements about the variability in burial attributes. One might expect to find evidence for differential burial treatment among different social groups. However, only the burial treatment of the Natchez chiefs and their servants have been described. Burial treatment and customs surrounding the interment of less important persons were not described in early historic accounts.

Patterns of social stratification may influence the distribution of stature and the distributions of bone and dental pathologies. Stature has been suggested as a possible correlate of social status (Haviland 1967; Buikstra 1972; Willey 1973). Unless certain culturally determined factors are operating, stature is expected to approximate a normal distribution.

In most stratified societies, high status groups tend to have fewer nutritional stresses and disease problems than low status groups. Similarly, in a society with a redisbributional economy, one might expect nutritional deficiency and associated disorders, particularly some infectious diseases (Kallen 1971), to be more frequent among low status groups, since high status groups should have easier access and control over food resources. Differential distributions of pathological conditions suggestive of this might be observed. Bone pathologies may also suggest differential activities among status groups. The incidence and distribution of dental decay may be related to cultural factors surrounding food availability, selection, and distribution.

CHAPTER III

SITE DESCRIPTION

Chucalissa (40SY1) is a Mississippian site, located nine miles south of Memphis, Tennessee, on the bluffs of the Mississippi River bottoms (Nash 1972:1-2) (Figure 1). This bluff location is rare for a Mississippian site, as most of the larger sites of the surrounding Arkansas and Mississippi regions are located on the natural levees of the Mississippi flood plain (Nash 1955:49). The town pattern of Chucalissa (Figure 2) includes a central plaza encircled by a residential ridge (Unit 3), a platform mound (Unit 5) on the north edge of the plaza, and a small burial mound (Unit 4) on the west edge of the plaza. Unit 3, thought to have been the residence of high status individuals, is comprised of a series of superimposed house mounds (Smith 1973:8). The largest village area (Unit 6) is located to the north of the platform mound. To the south and to the east of this platform mound/plaza complex are other village areas, Unit 2 and Unit 1, respectively.

Occupation of Chucalissa during the Mississippian period dates roughly from A. D. 1000 to 1600. During this 600 year span, four occupations are recognized (Smith 1972: ii-vi). These are the Ensley Phase, dating about A. D. 1000-1100; the Mitchell Phase, about 1200 A. D.; the Boxtown Phase, about 1400 A. D.; and the Walls Phase, about

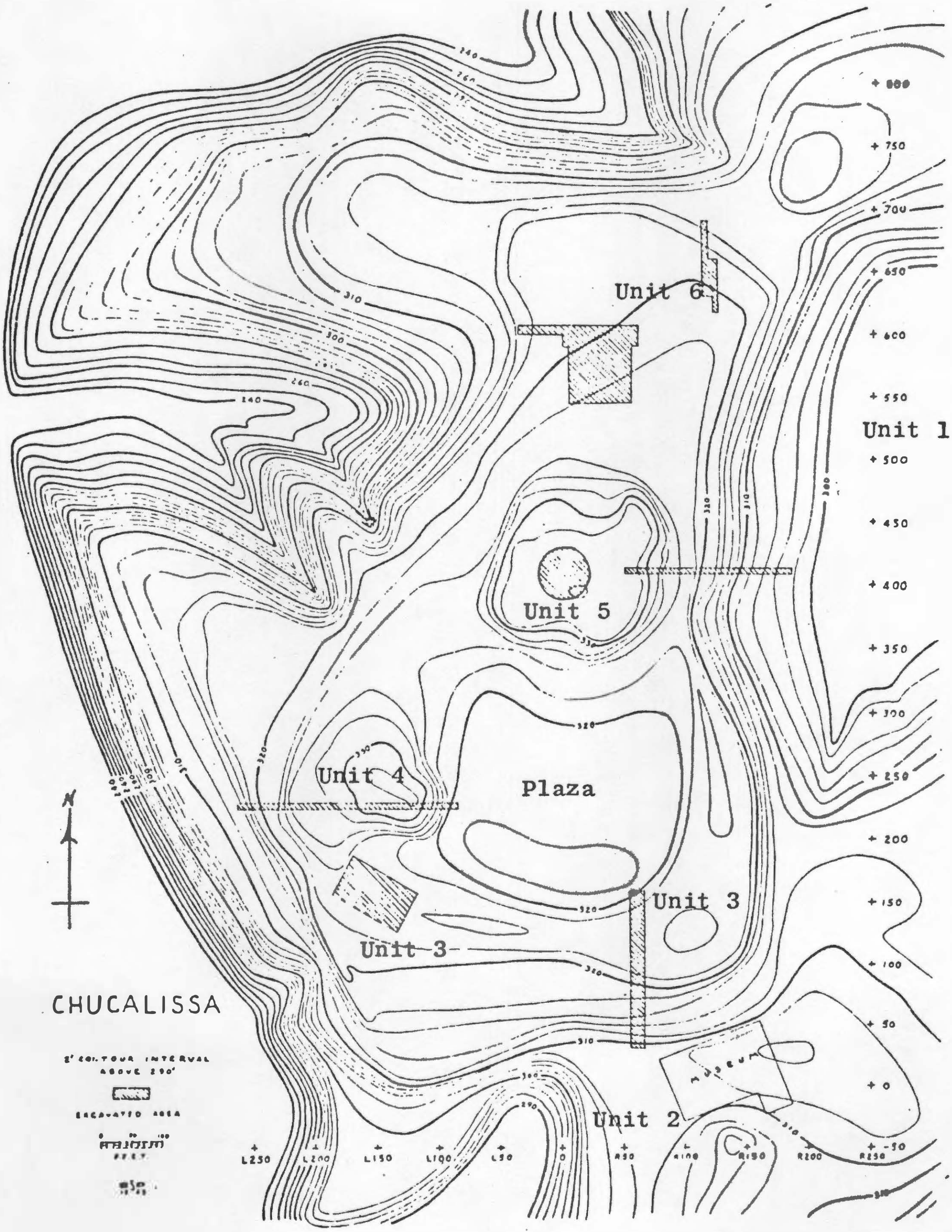

Figure 2. Map showing the excavated units within the site (taken from Smith 1969:27).

1500 A. D. It was during the Walls Phase that Unit 5 was constructed and Unit 4 was used as a burial mound.

The present investigation deals primarily with the Late Mississippian occupation at Chucalissa. The Late Mississippian includes the Boxtown and the Walls Phases, although burials representing all four phases of occupation have been included. Most of the burials are thought to be Late Mississippian (Smith 1976) or have been previously assigned to phases of the Late Mississippian (Smith 1972: ii,2). It is doubtful whether the inclusion of burials which are not Late Mississippian will effectively direct the outcome of this investigation, though the transition to the Late Mississippian at Chucalissa may have involved a more complex social organization (Smith 1973:8).

The manner in which the burials were excavated does not facilitate the assignment of burials to a specific occupation. The most reliable assignment of burials to a specific phase is made through ceramics. The basic ceramics at Chucalissa during the Late Mississippian are Bell Plain and Neely's Ferry Plain, with Parkin Punctate as the primary decorative type. Kent Incised, Ranch Incised, Rhodes Incised, Walls Engraved, and Hall Engraved are the distinctive pottery types of the Walls Phase. Barton Incised and Old Town Red are found in the Boxtown Phase, but also occur sporadically in the Walls Phase. Realizing that most burials are not accompanied by pottery, the designation of each burial to a specific phase is hazardous, if not impossible. The majority of burials with grave goods, particularly pottery, are limited to the areas around the platform mound/plaza complex. Excluding burials for which there are no pottery would largely affect the village areas and reduce this portion of the sample.

CHAPTER IV

MATERIALS AND METHODS

The skeletal material used in this investigation is housed at the C. H. Nash Museum at Chucalissa. The entire sample consists of 162 burials, for which there is recorded information. Age estimations, sex determination, and observations on pathology were made by the writer, and this information is on file at the C. H. Nash Museum. The material is of known provenience within the site, and while its chronological affiliations are less well known, most of the burials are thought to be Late Mississippian (Smith 1976). Burial data was coded using the terminology for burial description in Sprague (1968). Statistics and distributions were computed on the IBM 360/65 computer at The University of Tennessee Computing Center, using SPSS (Nie et al. 1975) programs FREQUENCIES, CROSSTABS, and BREAKDOWN.

Demographic Data

The sexing criteria used are reviewed in Bass (1971). General characteristics for sexing the pelvis are the width of the sciatic notch and the presence of the preauricular sulcus. The method of Phenice (1969) involving the medial aspect of the pubis, the ventral arc, and the subpubic concavity were used. General dimorphic features of the skull, such as the size of the mastoid processes and the presence of supraorbital ridges, and the size of the long bones and their joints were also used.

The criteria for estimating age have been reviewed in Bass (1971) and are described for adults and subadults. Epiphyseal-diaphyseal union of long bones and epiphyseal union of the ischium, the iliac crest, and the sacrum established the lower age limit for adults. Approximate ages for the union of the epiphyses of these bones is summarized in McKern (1970). Pubic symphyses casts for males (McKern and Stewart 1957) and for females (Gilbert and McKern 1973) were employed to estimate age when the standards for epiphyseal union were no longer useful. The degree of cranial suture closure (Krogman 1962:76-91) and tooth wear patterns observed by the writer established general age ranges for older adults, in the absence of other age indicators. For subadults, reference was made to the chart of root development and tooth eruption sequence in Schour and Massler (1941). Fusion of the elements of the occipital bone (Redfield 1970), of the pelvis (Bass 1971: 148), and of the vertebrae (Bass 1971:77) were also observed.

Age categories assigned were prenatal, birth up to 1 year, 1 year to 5 years, 6 to 11, 12 to adult, adult to 29, 30 to 39, and 40 and over. These age categories were established to approximate those used by Nash (1972), but were later recoded as adult and subadult.

Burial Data

The provenience of burials was established by excavated units within the site (Figure 2). The burials from Unit 1, Unit 2, and Unit 6 have been pooled to represent one village sample. The single burial from Unit 5 has been excluded because of its uncertain relationship with the rest of the site.

Burial data was taken from burial forms on file at the C. H. Nash Museum, and coded for burial form, position of the skeleton within the grave, individuality, and grave preparation. Burials for which there were no burial forms or recorded information were excluded.

Burial form was coded as primary, secondary, or unknown, depending on the degree of articulation of the skeleton. In a few cases there seems to have been removal of the skeleton from the grave or an empty burial pit. Nash (1972:12) noted that bones of earlier burials were thrown aside if encountered when making a new burial. Smith (1972:12), however, believes this situation is the result of temporary burial of the body followed by subsequent removal and reinterment. This type of burial form was recorded as unknown.

Position of the skeleton within the grave was recorded for primary burials as extended, flexed, semi-flexed, standing, and sitting.

Individuality, representing the number of individuals within a grave or the completeness of the skeleton, was coded as partial, single, double, or multiple.

Grave preparation was coded as either the presence of absence of a burial pit. Nash (1972:11-12) identified three types of burial pits, one of which was a scooped-out grave. This was roughly 6 inches in depth, while the other two types of pits were of varying depths, greater than 6 inches. For most burials, there was no evidence of a burial pit recorded; or if it was recorded as scooped-out, no dimensions of the grave were given. Scooped-out graves were recorded as burials without burial pits.

Grave Associations

Most grave associations are primarily pottery vessels, although items of shell and worked bone and stone do occur. Grave associations were coded as utilitarian and non-utilitarian artifacts. This was somewhat complicated by pottery since it is difficult to ascertain whether or not decorated or effigy pottery had a domestic function. Grave associations, such as pieces of mussel shell, miscellaneous pieces of stone and bone, and isolated pottery sherds were excluded from these categories, since these items could have occurred in the burial fill. In some burials they were probably actual grave objects due to their number and placement.

Pottery styles have been described by Smith (1972: ii-vi). Decorated pottery is more common from the area around the plaza than from the village areas (Smith 1973: 13). Domestic forms, such as plain water bottles, bowls, and jars, and effigy and decorated vessels occur in graves. Pottery was coded as decorated-effigy or plain.

Artificial Cranial Deformation

The type of artificial cranial deformation found at Chucalissa is fronto-occipital flattening. Cranial deformation was coded as either present or absent. This data was taken from both burial forms and observations on crania.

Stature

The estimation of stature poses several problems. (1) The use of regression formulae for the estimation of stature should be appropriate for the population which is being considered. Ideally, these should be derived from a sample of that population. This, of course, is difficult when working with prehistoric populations since actual stature is unknown. (2) This problem is compounded by contrasting estimations based on arm and leg bones of the same individual. Different long bone proportions are found in different populations. This is related to the application of an appropriate regression formula, and is reflected in the calculation of formulae for different populations (Krogman 1962:168-177). (3) Corrections for age (Trotter and Glesser 1951) have not been made because they would probably be misleading and confusing in a population context.

The present stature estimations were made using the formulae and tables of Genoves (1967). Only adults were considered, adult status being defined by complete epiphyseal union. Ten out of the 58 stature estimations were made using arm bones, either the ulna, radius, or humerus, while the remaining were made using either the tibia or femur. Krogman (1962:185) states that the calculation of stature from leg bones is preferable to that of arm bones, but in this case eliminating those estimations derived from arm bones would reduce the sample by 17 percent. It was noted that estimations derived from arm bones were in fairly close agreement with those derived from the tibia, though arm bones tended to give slightly higher estimations.

All measurements were made by the writer. Fourteen individuals were rechecked to insure consistency and accuracy, with an average difference of 0.21 millimeters and with a maximum difference of 1.0 millimeters.

Pathology

The classification of bone disorders was modified from the taxonomy of Litchenstein (1975). Bone pathologies were classified as bone inflammation or infection, degenerative joint disease, healed fractures, and osteoporosis of the skull. Dental pathology was recorded as the percentage of caries, alveolar abcesses, and antemortem tooth loss.

Only macroscopic observations were made; all observations on bone were recorded as present or absent.

Non-specific inflammation of bone is a common occurrence in prehistoric bones. It is customary to divide this phenomenon into periostitis, osteitis, or osteomyelitis, though this is somewhat artificial and arbitrary since bone is a biological unit (Brothwell 1965:134; Sandison 1968: 224). All cases of periositis, osteitis, osteomyelitis, and osteosclerosis have been placed in this category. Different diseases can produce identical structural changes in bone. Thus, syphilis may produce a periostitis which in some cases might not be distinguished from a subperiosteal reaction to micro-organisms of another disease. Inflammation or infection of the bone do not occur exclusively of other injury or pathology. Infection of bone may be produced by the introduction of a pyogenic organism into the bone following a compound fracture, infection of overlying soft tissue, or by an extension of some generalized disease, such as tuberculosis or syphilis, or some viral infection.

The category of bone inflammation was subdivided into inflammation of the axial skeleton and inflammation of the appendicular skeleton. These two categories are not mutually exclusive, though most non-specific infection of the skeleton involves the long bones. Some disease conditions do affect the bone in a specific manner and in localized areas.

Arthritic changes in the bone may result from injury, abnormal stress and strain, age, heredity, or hormonal factors. Degenerative joint disease is characterized by degeneration of the articular cartilage and hypertrophic changes in the bone ends, which leads to deformation of the articular surfaces (Litchenstein 1975:277). Arthritis is considered a sign of aging (Morse 1969), but there is evidence that degenerative changes in joints may be related to joint stress in prehistoric populations (Ortner 1968).

Degenerative joint disease is identified as occurring in either cartilaginous joints of the vertebral column and symphysis pubis, or in synovial joints of the hip, knee, and elbow. This distinction follows that made by Woodburne (1971:33-34). The articulations of the vertebral column are affected more frequently than any other joint.

The results of traumatic lesions are common in prehistoric bones. This category includes the evidence of healed fractures.

Osteoporosis is a decrease in bone density due to a decrease in the bone matrix. There are many causes among which are age, nutritional deficiency, endocrine disturbances, anemias, and disuse (Morse 1969:3). This condition involves abnormally porous bone either in a restricted or widespread area throughout the skeleton.

Traditionally pathologists have classified osteoporosis into two distinct types, one involving atrophy of aging individuals and a second involving some other disorder, commonly endocrine. Litchenstein (1975) thinks this is too arbitrary because there is often so much overlap to be useful or valid in formulating a comprehensive concept of pathogenesis, and so treats osteoporosis as a single disorder or end result. Bones often involved are those of the axial skeleton, though one does find comparable conditions in long bones.

Osteoporosis recorded here is restricted to the abnormal conditions seen in the skull. Osteoporotic pitting and spongy hyperostosis usually affect the parietals and less frequently the frontal and occipital. These areas of localized porosity are thought to be due to a period of illness or nutritional deficiency (Morse 1969:28), though hereditary hemolytic anemias (Mosely 1966) and iron deficiency anemia (Carlson, Armelagos, and van Gerven 1974) have been suggested as probable causes. Both adults and subadults exhibit this condition.

Dental pathology has been recorded as the percentage of caries, alveolar abcesses, and antemortem tooth loss. These are reported for adults only. Caries, abcesses, and antemortem tooth loss are all potentially interrelated categories of dental pathology, and one is confronted with the problem of whether these three categories should be treated separately or whether they should be considered progressive variants of the same process. The first two categories emphasize infection, while the third is the end product of caries, abcess, and periodontal degeneration (Saul 1972). Abcess may be initiated by a number of factors including caries, periodontal disease, and pulp exposure. Antemortem tooth loss may result from caries, pulp exposure leading to abcess formation, or alveolar destruction through periodontal disease.

CHAPTER V

PRESENTATION AND DISCUSSION OF RESULTS

In the discussion of the results, actual sample size varies from one test to another due to missing burial data or the fragmentary nature of the skeletal remains. For simplicity, Unit 6 refers to the entire village sample, even though burials from Unit 1 and Unit 2 are included.

Demographic Data

Demographic data are considered for both their importance in defining the sample and interpreting social relationships. The total sample includes 148 individuals. Fourteen burials could not be assigned age or sex due to the fragmentary nature of their remains. Of these 14, 5 were adults of unknown sex, 2 were adult males, 3 were adult females, and 4 were subadults. In some cases the skeletal material had been lost or discarded, and was recorded only in burial forms. None of these burials have been included in age/sex distributions, however, these were later considered for further analysis of burials where appropriate.

Age and sex were assigned by the writer, and this is summarized in Table 1. The age categories presented approximate those given in Nash (1972). Table 1 suggests that the sample considered may be representative of the population occupying Chucalissa during the Late

Mississippian period. Both sexes are equally represented. Table 1 also reveals the high infant mortality of this population. This may be related to the high frequency of females in the age range from adult to 39 years, and indicative of factors surrounding childbirth.

Table 1. Demographic data for the sample from Chucalissa.

Age	Subadults N	Subadults %	Males N	Males %	Females N	Females %	Total N	Total %
Prenatal	7	4.7					7	4.7
Birth-1	24	16.2					24	16.2
1-5	19	12.8					19	12.8
6-11	4	2.7					4	2.7
12-Adult	9	6.1					9	6.1
Adult-29			19	12.8	23	15.5	32	28.4
30-39			13	8.8	13	8.8	26	17.6
40+			12	8.1	5	3.4	17	11.5
Total	63		44		41		148	
Percent		42.6		29.7		27.7		100.0

The percentages for the different age categories in Table 1 are consistently higher than those given by Nash (1972). This is probably due to a bias in the sample used by Nash, which was mainly composed of burials from Unit 3.

Demographic data for Unit 3, Unit 4, and Unit 6 are presented in Table 2. Table 2 allows some generalizations about the age/sex distributions among Unit 3, Unit 4, and Unit 6. Both Unit 3 and Unit 6 are residential areas and each contains a representation of the entire population. However, Unit 4 is a burial area. This burial area was

Table 2. Demographic data for Unit 3, Unit 4, and Unit 6.

Unit	Pre-natal N	Pre-natal %	Birth-1 N	Birth-1 %	1-5 N	1-5 %	6-11 N	6-11 %	12 to Adult N	12 to Adult %	Adult-29 N	Adult-29 %	30-39 N	30-39 %	40+ N	40+ %	Total N	Total %
Unit 3																		
Males											6	10.2	6	10.2	4	6.8	16	27.1
Females											10	16.9	3	5.1	4	6.8	17	28.8
Subadults	5	8.5	6	10.2	7	11.9	2	3.4	6	10.2							26	44.1
Total	5		6		7		2		6		16		9		8		59	100.0
Unit 4																		
Males											3	25.0	5	41.7	1	8.3	9	75.0
Females											1	8.3	1	8.3			2	16.7
Subadults									1	8.3							1	8.3
Total									1		4		6		1		12	100.0
Unit 6																		
Males											10	13.0	2	2.6	7	9.0	19	24.6
Females											12	15.6	9	11.7	1	1.3	22	28.6
Subadults	2	2.6	18	23.4	12	15.6	2	2.6	2	2.6							36	46.8
Total	2		18		12		2		2		22		11		8		77	100.0
TOTAL	7		24		19		4		9		42		26		17		148	

probably limited to a restricted segment of the population, as 9 of the 12 individuals from Unit 4 are adult males, while there are only 2 adult feamles and 1 subadult.

Although the number of individuals in the different age categories are fairly evenly distributed between Unit 3 and Unit 6, the percentages in Table 2 suggest a slight trend for females of Unit 3 to have lived longer than the females of Unit 6, though the opposite is true for males. The decrease of Unit 6 males in the age category 30-39 years presents a problem. The absence of males in this age range may be due to some factor which prevented their burial at the site, such as death during war or hunting exploits. There is a disproportionate number of males and females within Unit 6. Within Unit 3, the distribution of males and females is fairly equal. But in Unit 6 there is a greater number of males occurring in the age category of 40 years and over. With one exception, all females fall into the age range of adult to 39 years, while most females are found in the age range of adult to 29 years. This distribution of males and females in Unit 6 could be due to (1) a bias introduced in aging, though all ages were made consistently by one observer, (2) a bias introduced by differential preservation or excavation, or (3) cultural factors affecting the distribution of females in Unit 6. If a bias of differential preservation is operating on age, one might expect it to occur independently of sex. This distribution of females may be related to factors surrounding the high infant mortality of Unit 6.

There is a disproportionate number of infants from birth to one year between Unit 3 and Unit 6. The difference in infant mortality between these two residential units could be due to (1) a bias introduced by differential excavation or preservation of (2) differential fertility of females, coupled with differential care afforded infants and conveyed by residence. The situation of differential excavation or preservation implies a special burial locale for infants, and can reasonably be excluded because burials are associated with house lot. One might also expect to find a disproportionate number of individuals occurring in some other age group. The high infant mortality of Unit 6 may be a factor in the uneven distribution of female skeletons also observed in Unit 6.

Archaeological Data

A discussion of burial attributes and grave associations, as they may have bearing on defining differences between groups of individuals, is presented. Ages within the sample have been recorded as adult or subadult.

Burial form was recorded as primary, secondary, or unknown, depending on the degree of articulation of the skeleton. Table 3 presents frequencies and percentages for the different burial forms for adults and subadults. Chi-square was calculated to test the relationship of age and

Table 3. Frequencies, percentages, and chi-square for burial form for adults and subadults.

Burial Form	Adults		Subadults		Total			
	N	%	N	%	N	%	D.F.	χ^2
Primary	82	94.3	45	83.3	127	90.1	1	4.34*
Secondary	4	4.6	9	16.7	13	9.2		
Unknown	1	1.1			1	0.7		
Total	87		54		141			
Percent		100.0		100.0		100.0		

*Significant at .05 level.

burial form, and is also presented in Table 3. Only one burial of the unknown type was recorded, and so was eliminated from the calculation of χ^2. Table 3 reveals that 90.1 percent of all burials are primary burials, while secondary and unknown account for 9.2 percent and 0.7 percent, respectively. Since there is a significant relationship ($P < .05$) between burial form and age, a closer examination of individual burials which deviate from the predominant mode of primary burial may offer information pertaining to this variation. This information is summarized in Table 4.

Secondary burials were noted by their varying degrees of disarticulation, some indicating that they may have been bundle burials. From Table 4, it can be seen that subadult secondary burials usually are not single burials and have no grave associations. Of the four adult burials, three are from Unit 6.

Table 4. Summary of secondary burials.

Unit	Burial	Sex	Age	Individ-uality	Grave Associa-tions
3	23	female	30-35	partial	yes
3	30	indeterminate	6-7	double	none
3	31	indeterminate	12-13	double	none
3	41	indeterminate	6-7	partial	none
3	49	indeterminate	8-9	single	none
6	12	indeterminate	3-4	single	unknown
6	32	female	30-35	single	yes
6	53	male	23-27	single	none
6	60	male	55-60	single	none
2	6	indeterminate	12-18 mos.	multiple	none
2	7	indeterminate	6-7	multiple	none
2	8	indeterminate	9-10	multiple	none
2	9	indeterminate	6 mos.-1	multiple	none

There is one burial which is recorded as being of a burial form recognized as neither primary nor secondary. Burial 36 of Unit 6 is the partial remains of a male skeleton. Smith (1972:12) interprets this situation as the result of temporary burial, followed by removal and reinterment of the bones as a bundle burial.

Position of the skeleton within the grave was recorded for primary burials. Frequencies and percentages for the different positions assumed by the skeleton within the grave are presented in Table 5 for adults and subadults. Though there are a variety of positions which the skeleton may take, most burials are extended (Nash 1972:11). Ninety-four burials or 72.9 percent of the entire sample are extended. Individual burials that deviate from the pattern of extended position are examined for a possible explanation for this variation. The data for these burials is summarized in Table 6.

Table 5. Frequencies and percentages for burial positions for adults and subadults.

Position	Adults		Subadults		Total	
	N	%	N	%	N	%
Extended	72	84.7	22	50.0	94	72.9
Flexed	5	5.9	7	15.9	12	9.3
Semi-flexed	6	7.1	13	29.5	19	14.7
Standing			2	4.5	2	1.6
Sitting	2	2.4			2	1.6
Total	85		44		129	
Percent		100.0		100.0		100.0

Table 6 shows that 11 out of the 35 burials which are not in an extended position have grave associations. Nine of these 11 are subadults, and, with one exception, all are under 4 years of age. Of the adults, males are from Unit 4, while females are from both Unit 3 and Unit 6.

It was noted that subadult burials in the categories other than extended were nearly equal to the number of extended burials. These other categories were combined into one expressing flexed burial for both adults and subadults. Burial position was then tested by χ^2 to see if these two burial positions occurred independently of age. Table 7 presents the frequencies for these two categories and χ^2 value. The two standing burials were excluded from the

Table 6. Summary of burials which are not in an extended position.

Unit	Burial	Sex	Age	Position	Grave Associa-tions
3	9	indeterminate	3-4	semi-flexed	yes
3	12	indeterminate	prenatal	semi-flexed	none
3	13	indeterminate	prenatal	semi-flexed	none
3	26	female	18-23	flexed	none
3	42A	indeterminate	newborn	standing	none
3	42B	indeterminate	newborn	standing	none
3	45	indeterminate	3-4	flexed	none
3	46	female	16-21	flexed	none
3	51	indeterminate	6-12 mos.	semi-flexed	none
3	52	indeterminate	3-9 mos.	flexed	none
3	57	indeterminate	2-3	semi-flexed	yes
3	58	indeterminate	adult	flexed	none
3	63	indeterminate	10-13	semi-flexed	yes
3	64	female	35-40	flexed	none
3	73	female	18-23	flexed	none
4	1	male	30-35	semi-flexed	none
4	2	male	33-38	sitting	yes
4	4	male	35-40	sitting	none
4	5	male	21-26	semi-flexed	none
4	6	male	25-30	semi-flexed	yes
4	7	male	25-30	semi-flexed	none
6	5	indeterminate	2-3	semi-flexed	none
6	6	indeterminate	3 mos.	semi-flexed	yes
6	8	male	45-50	semi-flexed	none
6	9	female	17-21	semi-flexed	none
6	19	indeterminate	2-3	flexed	none
6	26	indeterminate	2-3	semi-flexed	none
6	29	indeterminate	3 mos.	flexed	none
6	30	indeterminate	3 mos.	semi-flexed	yes
6	34	indeterminate	newborn	semi-flexed	none
6	44	indeterminate	child	flexed	none
6	55	indeterminate	newborn	semi-flexed	yes
6	66	indeterminate	prenatal	semi-flexed	yes
6	67	indeterminate	1 year	semi-flexed	yes
6	68	indeterminate	6-9 mos.	semi-flexed	yes

calculation of χ^2. There is a significant association ($P < .01$) between age and the position of the skeleton within the grave.

Table 7. Frequencies and chi-square for burial position.

Position	Adults	Subadults	Total	D.F.	χ^2
Extended	72	22	94	1	13.683*
Flexed	13	20	33		
Total	85	42	127		

*Significant at .01 level.

Individuality or the completeness of the skeleton within the grave was noted to see if it discriminated among adult and subadult burials. Table 8 expresses the frequencies and percentages for the separate categories of individuality. Single burial is the most frequent among

Table 8. Frequencies and percentages for individuality for adults and subadults.

	Adults		Subadults		Total	
Individuality	N	%	N	%	N	%
Partial	3	3.3	3	5.0	6	4.0
Single	81	89.0	42	70.0	123	81.5
Double	2	2.2	8	13.3	10	6.6
Multiple	5	5.5	7	11.7	12	7.9
Total	91		60		151	
Percent		100.0		100.0		100.0

both adults and subadults. One hundred and twenty-three or 81.5 percent of adult and subadult burials are single. Data for individual burials that deviated from the predominant mode of single burial are summarized in Table 9.

Table 9 shows that double and multiple burials are restricted to subadults and females, with the exception of Unit 4 burials. Grave associations with these burials are rare.

A disproportionate number of burials that were not single to those that were single was observed among subadults. Chi-square was calculated to test the relationship of individuality with age, and Table 10 presents the results of this test. The burials with only partial skeletal elements were excluded from the calculation of χ^2. There is a significant association ($P < .01$) between individuality and age.

Grave preparation was recorded as the presence or absence of a burial pit. Since a disproportionate number of burials with burial pits are subadults, the relationship of age with the presence of a burial pit was tested by χ^2. Table 11 presents the frequencies, percentages, and a χ^2 value for grave preparation for adults and subadults. The presence of a burial pit was found to be significantly associated ($P < .01$) with subadult burials.

Information on burial attributes was compiled for males and females to see if sex was a factor in burial treatment. Table 12 presents frequencies and percentages

Table 9. Summary of burials which are not single.

Unit	Burial	Sex	Age	Individ-uality	Grave Associa-tions
3	10	indeterminate	prenatal	double	none
3	11	indeterminate	prenatal	double	none
3	23	female	30-35	partial	yes
3	30	indeterminate	6-7	double	none
3	31	indeterminate	12-13	double	none
3	41	indeterminate	5-6	partial	none
3	42A	indeterminate	newborn	double	none
3	42B	indeterminate	newborn	double	none
3	73	female	18-23	multiple	unknown
3	73A	indeterminate	4-5	multiple	unknown
3	73B	indeterminate	12-13	multiple	unknown
3	73C	indeterminate	6-12 mos.	multiple	unknown
4	4	male	35-40	multiple	yes
4	5	male	21-26	multiple	none
4	6	male	25-30	multiple	none
4	7	male	25-30	multiple	none
4	10A	female	30-35	double	yes
4	10B	indeterminate	12-13	double	yes
6	1	indeterminate	child	partial	none
6	7	indeterminate	child	partial	none
6	17	female	25-30	double	none
6	23	indeterminate	prenatal	double	none
6	36	male	adult	partial	none
6	56	indeterminate	adult	partial	none
2	6	indeterminate	12-18 mos.	multiple	none
2	7	indeterminate	6-7	multiple	none
2	8	indeterminate	9-10	multiple	none
2	9	indeterminate	6-12 mos.	multiple	none

Table 10. Frequencies and chi-square for individuality for burials of adults and subadults.

Individuality	Adults	Subadults	Total	D.F.	χ^2
Single	81	42	123	1	7.617*
Not single	7	15	22		
Total	88	57	145		

*Significant at .01 level.

Table 11. Frequencies, percentages, and chi-square for grave preparation.

Grave Preparation	Adults N	Adults %	Subadults N	Subadults %	Total N	Total %	D.F.	χ^2
Pit present	17	23.6	24	54.5	41	35.3	1	10.123*
Pit absent	55	76.4	20	45.5	75	64.6		
Total	72		44		116			
Percent		100.0		100.0		100.0		

*Significant at .01 level.

Table 12. Frequencies and percentages for burial attributes for males and females.

Burial Attribute	Males N	Males %	Females N	Females %	Total N	Total %
Burial Form						
Primary	39	92.8	38	95.0	77	93.9
Secondary	2	4.8	2	5.0	4	4.9
Unknown	1	2.4			1	1.2
Total	42	100.0	40	100.0	82	100.0
Position						
Extended	32	80.0	36	90.0	68	85.0
Flexed	1	2.5	3	7.5	4	5.0
Semi-flexed	5	12.5	1	2.5	6	7.5
Sitting	2	5.0			2	2.5
Total	40	100.0	40	100.0	80	100.0
Individuality						
Partial			1	2.4	1	1.2
Single	38	90.5	38	90.5	76	90.5
Double			2	4.8	2	2.4
Multiple	4	9.5	1	2.4	5	6.0
Total	42	100.0	42	100.0	84	100.0
Grave Preparation						
Pit present	9	25.7	5	16.1	14	21.2
Pit absent	26	74.3	26	83.9	52	78.8
Total	35	100.0	31	100.0	66	100.0

for burial form, position, individuality, and grave preparation for males and females. Table 12 reveals that differences between males and females for these four burial attributes is negligible.

Grave associations were recorded as either present or absent, and were tested to see if sex was a contributing factor to their distribution. Table 13 presents frequencies, percentages, and a chi-square value for grave associations for males and females. Even though the χ^2 is not significant ($P > .05$), an examination of individual burials within Unit 3 and Unit 6 reveals that the greatest number of grave associations occur among the burials of females. Table 14 summarizes the data for individual burials with the greatest number of grave associations; Table 15 lists the different varieties of grave associations for males, females, and subadults.

Table 13. Frequencies, percentages, and chi-square for grave associations for males and females.

Grave Associations	Males		Females		Total		D.F.	χ^2
	N	%	N	%	N	%		
Present	18	45.0	26	66.7	44	55.7	1	2.930*
Absent	22	55.0	13	33.3	35	44.3		
Total	40		39		79			
Percent		100.0		100.0		100.0		

*Not significant at .05 level.

Table 14. Individual burials with the greatest number of grave associations.

Unit	Burial	Sex	Age	Grave Associations
3	33	female	23-28	"batty bear" effigy bowl; a small plain bowl; a plain water bottle; 2 shell earspools; a shell gorget; a marine shell; 5 mussel shells; 13 deer antler flaking tools
3	35	female	43-48	2 Parkin Punctate jars; a shell gorget; 4 shell beads
6	54	female	48-53	fish effigy bowl; Neely's Ferry jar; 4 mussel shells; a Neely's Ferry bowl
6	11	female	30-35	gar scale projectile point; "batty bear" effigy bowl; "hunchback" effigy water bottle; an ironstone abrader
6	25	female	28-33	turtle pot; Ranch Incised pot; cut disc of shell

Table 15. Grave associations for males, females, and subadults.

	Males	Females	Subadults
Shell	1	4	3
Beads	1	2	0
Gorgets	0	2	0
Earspools	0	1	0
Worked stone and bone	3	6	0
Pottery			
Effigy	2	5	3
Decorated	7	7	6
Plain	9	16	7
Miscellaneous stone and bone	1	2	0

Grave associations were also tested by χ^2 to see if their distribution was affected by age. Table 16 presents frequencies, percentages, and chi-square for grave associations for adults and subadults. There is a significant association ($P < .025$) between adult status and the presence of grave goods.

Table 16. Frequencies, percentages, and chi-square for grave associations for adults and subadults.

Grave Associations	Adults		Subadults		Total		D.F.	χ^2
	N	%	N	%	N	%		
Present	46	53.5	18	30.5	64	44.1	1	6.592*
Absent	40	44.5	41	69.5	81	55.9		
Total	86		59		145			
Percent		100.0		100.0		100.0		

*Significant at .025 level.

Frequencies and percentages of grave associations were tabulated for adults and subadults of Unit 3, Unit 4, and Unit 6 to note any pattern or distribution. This information is presented in Table 17. Though no differences in the distribution of grave associations among these units were noted, the burials of Unit 3 do have a greater number of grave associations. Table 18 summarizes this data for Unit 3 and Unit 6. Table 18 presents the number of burials for which grave associations occur, except for pottery. Some burials contain more than one pottery vessel.

Table 17. Frequencies and percentages for grave associations for Unit 3, Unit 4, and Unit 6.

Grave	Unit 3		Unit 4		Unit 6		Total	
Associations	N	%	N	%	N	%	N	%
Present	30	50.0	4	33.3	32	42.7	66	44.9
Absent	30	50.0	8	66.7	43	57.3	81	55.1
Total	60		12		75		147	
Percent		100.0		100.0		100.0		100.0

The only burials with imported items are from Unit 3. Burial 33 is that of a female and has a large marine shell associated with it. Burial 8 is a subadult burial and has a Neely's Ferry bowl with red crosses painted inside (G. P. Smith 1976). The grave associations among Unit 4 burials express its uniqueness as a special burial locale. Unit 4 burials are the only burials which have human bone as grave associations.

Table 18. Grave associations for Unit 3 and Unit 6.

	Unit 3	Unit 6
Shell	3	5
Beads	2	1
Gorgets	2	0
Earspools	1	0
Worked stone and bone	8	5
Miscellaneous stone and bone	0	3
Pottery		
Decorated	15	9
Effigy	8	5
Plain	20	14

Grave associations were classed as utilitarian or non-utilitarian to see if this might offer a distinction between Unit 3 and Unit 6. This was recorded for each burial, rather than for each artifact encountered within the grave. These categories were complicated by the inclusion of pottery, since it is difficult to ascertain whether or not decorated or effigy pottery functioned in a domestic context. However, both decorated and effigy pottery were provisionally classified as non-utilitarian artifacts. These data are presented in Table 19. No difference in the distribution of these artifacts between Unit 3 and Unit 6 was detected.

The frequencies of utilitarian and non-utilitarian artifacts were tabulated for males, females, and subadults and are presented in Table 20. Small sample size and the problem with low expected frequencies encountered in most

Table 19. Frequencies of utilitarian and non-utilitarian artifacts for Unit 3 and Unit 6.

Artifacts	Unit 3	Unit 6	Total
Utilitarian	15	15	30
Non-utilitarian	9	4	13
Both	5	7	12
Total	29	26	55

Table 20. Frequencies of utilitarian and non-utilitarian artifacts for males, females, and subadults.

Artifacts	Males	Females	Subadults	Total
Utilitarian	10	14	7	31
Non-utilitarian	4	4	4	12
Both	3	8	3	14
Total	17	26	14	57

cells does not permit a test of significance, but sex does seem to be a controlling factor in the distribution of these artifacts, the greater frequency occurring with females. Age also seems to be a factor in regulating the distribution of these artifacts.

Because pottery is the most common grave association, the frequencies of decorated-effigy pottery and plain pottery for Unit 3 and Unit 6 are presented in Table 21. The distribution of decorated-effigy pottery does not seem to be greatly affected by unit.

Table 21. Distributions of pottery for Unit 3 and Unit 6.

	Unit 3	Unit 6	Total
Decorated-effigy	8	6	14
Plain	15	14	29
Both	5	5	10
Total	28	25	53

The distribution of decorated-effigy pottery and plain pottery for age and sex were recorded for Unit 3 and Unit 6. These data are summarized in Table 22. Table 22 shows both decorated-effigy pottery and plain pottery to be fairly evenly distributed among males, females, and subadults of Unit 3. One might expect a uniform distribution like this in a society in which status is acquired through

Table 22. Distribution of pottery for males, females, and subadults of Unit 3 and Unit 6.

Pottery	Males	Females	Subadults	Total
Unit 3				
Decorated-effigy	3	2	2	7
Plain	4	6	5	15
Both	1	2	2	5
Total	8	10	9	27
Unit 6				
Decorated-effigy	2	2	2	6
Plain	5	7	2	14
Both	1	4	0	5
Total	8	13	4	25

birth. However, among Unit 6 burials there is a differential distribution of pottery which increases as one progresses from subadults to males to females. This may partially be due to a division of labor between males and females of Unit 6.

Status

The implications for social stratification at Chucalissa can now be considered. The distribution of decorated-effigy and plain pottery among males, females, and subadults of Unit 3 is fairly uniform. A distribution like this might be expected in a society in which status is acquired at birth. Based on the distribution of grave associations, Unit 3 and Unit 6 may have represented two distinct social groups. However, this distinction is not as clear-cut as might be expected. There is no difference in the distribution of utilitarian and non-utilitarian artifacts between Unit 3 and Unit 6, though the only imported items associated with burials are from Unit 3. The distribution of decorated-effigy and plain pottery does not seem to be affected by unit. This might be expected if these two residential units were also distinct social units. However, this could also mean that there was no social difference between these two residential units.

The demographic data indicate that females of Unit 3 lived longer than the females of Unit 6. This may be related to the high infant mortality in Unit 6. This may be taken as support for the social distinction between Unit 3 and Unit 6, although it could be only an expression of differential fertility associated with residence.

Distinction in male-female relationships are revealed by the distribution of grave associations. There seems to be no difference in burial attributes of males and females. Though grave associations occur independently of sex (P .05), the greater number of grave associations are found with females. Decorated-effigy and plain pottery is fairly evenly distributed among males, females, and subadults of Unit 3, but in Unit 6, females possess the greatest number of both decorated-effigy and plain pottery vessels. This, in part, may be due to the division of labor between males and females of Unit 6.

The tenuous social position of subadults is suggested by their greater variability in burial attributes, implying differential burial treatment which served to distinguish the social position of adults from that of subadults. The most frequent type of burial defined by burial attributes is a single, primary extended burial occurring in the absence of a burial pit. There are significant associations between subadults and secondary burial ($P < .05$), flexed burial ($P < .01$), multiple burial ($P < .01$), and the presence of a burial pit ($P < .01$).

The relationship of Unit 4 with the rest of the site is difficult to interpret. Unit 4 was probably limited to a restricted segment of the population. Nine of the 13 individuals from Unit 4 are adult males, and all but one of the 13 individuals are adults. Greater variability in burial attributes was encountered here than in any other unit. Six of the burials from Unit 4 are flexed, and are double or multiple burials. Unit 4 burials are the only burials in which human bone occurs as a grave association. Unit 4 may have been a burial locale of high status individuals, with the variability in burial attributes and grave associations serving to distinguish it from the remainder of the site.

Artificial Cranial Deformation

The procedure of artificial cranial deformation was noted as a possible indicator of high status. Table 23 presents frequencies for cranial deformation for Unit 3, Unit 4, and Unit 6. Table 23 suggests that the practice of artificial cranial deformation may have been more popular among Unit 3 individuals. A closer examination of those

Table 23. Frequencies of artificial cranial deformation for Unit 3, Unit 4, and Unit 6.

Cranial Deformation	Unit 3	Unit 4	Unit 6	Total
Present	9	0	3	12
Absent	11	3	4	18
Total	20	3	7	30

individuals with cranial deformation is warranted because of the small sample. Table 24 summarizes the data for individuals with artificial cranial deformation.

Table 24. Summary of data for individuals showing artificial cranial deformation.

Unit	Burial	Sex	Age	Grave Associations
3	1	male	17-21	unknown
3	7	female	25-30	incised jar and effigy pot
3	20	female	38-43	projectile point
3	21	male	35-40	turtle effigy
3	22	male	18-23	Parkin Punctate pot
3	25	male	17-21	jar with open eye symbol
3	46	female	16-21	none
3	54	indeterminate	10-13	none
3	57	indeterminate	2-3	plain pot
2	8	indeterminate	9-10	none
6	3	female	30-35	none
6	9	female	16-21	none

Table 24 shows that six burials from Unit 3 with cranial deformation have grave associations. Four of these have decorated or effigy pottery associated, further suggesting that this practice may have been associated with high status. Both males and females of Unit 3 show cranial deformation, while the only two adults from Unit 6 showing cranial deformation are females.

Stature

Stature has been identified as a possible status correlate (Haviland 1967; Buikstra 1972; Willey 1973). If Unit 3, Unit 4, and Unit 6 are distinct social units, cultural factors may be operating which are affecting differences in stature among these groups. Means and standard deviations for males and females of Unit 3, Unit 4, and Unit 6 are presented in Table 25. Stature was estimated using the methods of Genoves (1967).

Table 25. Means and standard deviations for stature for males and females.

Unit	Mean	S.D.	N
Males			
3	163.275	4.696	11
4	168.307	3.313	9
6	167.497	1.699	6
Total	165.991	4.3203	26
Females			
3	155.770	5.168	14
4	157.210	4.810	2
6	151.837	4.173	15
Total	153.960	4.997	31

Analysis of variance allows one to test whether the means of subpopulations are significantly different or whether the difference between means are due to random sampling error. The null hypothesis tested is that the observed differences in mean stature estimations for both males and females between Unit 3, Unit 4, and Unit 6 can be attributed to random sampling error. Table 26 presents the analysis of variance summaries for both males and females.

Table 26. Analysis of variance summaries for males and females.

Source	D.F.	S.S.	M.S.	F
<u>Males</u>				
Between groups	2	143.8125	71.9063	5.1232*
Within groups	23	322.8125	14.0353	
Total	25	466.6250		
<u>Females</u>				
Between groups	2	134.9883	67.4941	3.0772**
Within groups	28	614.1367	21.9334	
Total	30	749.1250		

*Significant at .025 level.

**Not significant at .05 level.

The differences in means for males is significant ($P < .025$), as indicated by the F ratio. The null hypothesis of differences created by random sampling error is rejected, and an explanation for this variance must be sought. Buikstra (1972) offered two models to explain the relationship between high status and tall stature. In societies with achieved status, leaders may be chosen as the individuals with special attributes. In societies in which status is ascribed, social positions are inherited and imply some genetic link between high status individuals.

The results of the analysis of variance for males shows that tall stature is significantly associated ($P < .025$) with Unit 6, which may have been a low status residential unit, though the tallest males come from Unit 4. In light of the two models offered in Buikstra (1972) and the relationship of stature and status in the Dallas society (Hatch and Willey 1974), these results are difficult to interpret. Two possibilities exist--(1) the estimations given are actually representative of the population, implying some unique cultural or biological factor, which effectively maintains a relationship between high social status and short stature, or (2) there is a problem in the analysis of variance, created by skewed distributions resulting from the lack of adequate samples. This second possibility is more reasonable. The standard deviation (Table 25) reveals that the distribution of stature in Unit 6 is too narrow. Since Unit 6 is a residential area, one might expect more variance among stature estimations. Another complication is the apparent lack of an adequate sample. Only 57.8 percent of the total male population could be considered. The remaining 42.2 percent were missing due to the loss or fragmentary nature of the appropriate skeletal elements.

For females, the null hypothesis of variation due to random sampling error is not rejected ($P > .05$). In this test, 72.1 percent of the total female population was used. Table 26 gives a summary of the analysis of variance for females.

Pathology

The frequencies for bone pathologies for Unit 3, Unit 4, and Unit 6 were tabulated for distributions which may have been attributed to the effects of social interaction or relationships. Some burials have been excluded due to the degree of completeness, thus, accounting for the uneven sample sizes for each category.

The effects of bone inflammation were divided into inflammation of the axial skeleton and inflammation of the appendicular skeleton. Frequencies and percentages of inflammation of the axial skeleton for Unit 3, Unit 4, and Unit 6 are presented in Table 27. There is no apparent difference in the distributions of inflammation of the axial skeleton between these units. Inflammation or infection involving this part of the skeleton may have been associated with some specific disease form which occurred randomly throughout the population.

Frequencies and percentage for inflammation of the appendicular skeleton for Unit 3, Unit 4, Unit 6 are presented in Table 28. Table 28 shows that inflammation of the appendicular skeleton is more frequent in Unit 6. The nature of non-specific infection may offer an explanation for this difference. Inflammation of the bone may be

Table 27. Frequencies and percentages for inflammation of the axial skeleton for Unit 3, Unit 4, and Unit 6.

Axial Inflammation	Unit 3		Unit 4		Unit 6		Total	
	N	%	N	%	N	%	N	%
Present	3	15.0	2	18.2	4	15.5	9	15.8
Absent	17	85.0	9	81.8	22	84.6	48	84.2
Total	20		11		26		57	
Percent		100.0		100.0		100.0		100.0

Table 28. Frequencies and percentages for inflammation of the appendicular skeleton for Unit 3, Unit 4, and Unit 6.

Appendicular Inflammation	Unit 3		Unit 4		Unit 6		Total	
	N	%	N	%	N	%	N	%
Present	6	28.6	4	36.4	12	41.4	22	36.1
Absent	15	71.4	7	63.6	17	58.6	39	63.9
Total	21		11		29		61	
Percent		100.0		100.0		100.0		100.0

incurred through direct infection of the bone or infection due to injury, such as a soft tissue wound or a fracture. The difference in the distribution of inflammation of the appendicular skeleton between Unit 3 and Unit 6 may be related to aspects of differential activities, perhaps associated with occupation, between these groups. If this is a sign of a division of labor between these two residential units, inflammation of the appendicular skeleton may have been due to activities of Unit 6 individuals, which made them more susceptible to non-specific infection. Inflammation of the appendicular skeleton is also fairly high among individuals of Unit 4.

The effects of degenerative joint disease were classified into degenerative changes involving cartilaginous joints and degenerative changes involving synovial joints. Frequencies and percentages for degenerative changes involving cartilaginous joints are presented in Table 29 for Unit 3, Unit 4, and Unit 6. The distribution of this type of degenerative joint disease is rather uniform throughout the population, and thought to be representative of the occurrence of osteoarthritis. Vertebral osteoarthritis is frequent in human skeletal populations.

Frequencies and percentages for degenerative changes involving synovial joints are presented in Table 30 for Unit 3, Unit 4, and Unit 6. There seems to be no difference in the distribution of this type of joint disease between Unit 3 and Unit 6, though it is more frequent among Unit 4 individuals. Table 31 summarizes the data for individuals with this type of joint disease. Table 31 reveals that most individuals with this type of degenerative joint disease are males. This may be indicative of a division of labor between males and females.

Table 29. Frequencies and percentages for degenerative changes involving cartilaginous joints for Unit 3, Unit 4, and Unit 6.

Degenerative Changes	Unit 3		Unit 4		Unit 6		Total	
	N	%	N	%	N	%	N	%
Present	17	70.8	10	90.9	18	64.3	45	71.4
Absent	7	29.2	1	9.1	10	35.7	18	28.6
Total	24		11		28		63	
Percent		100.0		100.0		100.0		100.0

Table 30. Frequencies and percentages for degenerative changes involving synovial joints for Unit 3, Unit 4, and Unit 6.

Degenerative Changes	Unit 3		Unit 4		Unit 6		Total	
	N	%	N	%	N	%	N	%
Present	3	16.7	5	41.7	3	12.0	11	20.0
Absent	15	83.3	7	58.3	22	88.0	44	80.0
Total	18		12		25		55	
Percent		100.0		100.0		100.0		100.0

Table 31. Summary of data for individuals with degenerative changes involving synovial joints.

Unit	Burial	Sex	Age	Location
3	48	male	53-58	condyles of right femur
3	50	male	35-40	both glenoid fossa
3	66	female	55-60	heads of right and left radius; olecranon of the left ulna; the trochlear surfaces of both humeri
4	3	male	40-45	lateral condyle of right tibia; condyles of the right femur; right patella; distal right ulna and left radius
4	4	male	35-40	right glenoid fossa and both olecranon
4	6	male	25-30	right olecranon
4	7	male	25-30	right glenoid fossa; left femoral head and acetabulum
4	8	male	35-40	right glenoid fossa
6	16	female	33-38	both mandibular condyles
6	18	male	35-40	both patellae; right distal femur
6	45	female	30-35	left mandibular condyle

Frequencies and percentage of healed fractures for Unit 3, Unit 4, and Unit 6 are presented in Table 32. No difference in the distribution of healed fractures between Unit 3 and Unit 6 were observed, however, healed fractures do appear to be more frequent among individuals of Unit 4. A summary of data for individuals with healed fractures is presented in Table 33. Table 33 shows that most healed fractures are found among males, again probably associated with a division of labor with females, or the nature of activities participated in by males. The high frequency of healed fractures in Unit 4, coupled with the high frequency of inflammation of the appendicular skeleton and degenerative joint disease, may be indicative of the nature of activities that can be attributed to the high status associated with Unit 4.

Table 32. Frequencies and percentages for healed fractures.

Healed Fractures	Unit 3		Unit 4		Unit 6		Total	
	N	%	N	%	N	%	N	%
Present	3	13.0	4	36.4	3	12.0	10	16.9
Absent	20	87.0	7	63.6	22	88.0	49	83.1
Total	23		11		25		59	
Percent		100.0		100.0		100.0		100.0

Table 33. Summary of data on individuals with healed fractures.

Unit	Burial	Sex	Age	Fracture Site
3	38	male	38-43	right ulna
3	40	male	50-55	right ulna
3	48	male	53-58	left ulna
4	2	male	33-38	left radius
4	3	male	40-45	right clavicle and left femur
4	4	male	35-40	ribs
4	8	male	35-40	left clavicle
6	20	male	20-25	left clavicle
6	54	female	48-53	left fibula
6	60	male	55-60	right humerus

The frequencies and percentages for individuals of Unit 3, Unit 4, and Unit 6 with osteoporosis of the skull are presented in Table 34. Osteoporosis of the skull is

Table 34. Frequencies and percentages of osteoporosis for Unit 3, Unit 4, and Unit 6.

Osteoporosis	Unit 3		Unit 4		Unit 6		Total	
	N	%	N	%	N	%	N	%
Present	6	22.2	0		13	43.3	19	31.7
Absent	21	77.8	3		17	56.6	41	68.3
Total	27		3		30		60	
Percent		100.0				100.0		100.0

more frequent among individuals of Unit 6. Most of the osteoporosis occurs as localized spots porosity or pitting on the parietals or occipital near lambda. This type of osteoporosis is thought to be due to nutritional stress or anemias. Osteoporosis is commonly a condition associated with age, but it may occur in young and middle aged individuals, and even children. Table 35 summarizes the data on individuals with osteoporosis of the skull. Even when older adults (30 years and older) are eliminated, this type of osteoporosis is still more frequent among individuals of Unit 6. The high frequency of this type of osteoporosis in Unit 6 may be associated with the high infant mortality also encountered in Unit 6.

The percentage of caries, alveolar abcesses, and antemortem tooth loss was recorded for adults to see if residence may have been a factor in their distribution. Table 36 presents this information for Unit 3, Unit 4, and Unit 6. There seems to be no differences in the distributions of dental decay between Unit 3 and Unit 6. The deviations in Unit 4 probably reflect the sample size, but suggest Unit 4 as a restricted burial area.

Social Status and Pathology

Unit 3 and Unit 6 may have represented distinct social groups as well as separate residential areas, with Unit 4 as a special burial locale of high status individuals. This possibility has been examined using archaeological data. The differences observed in the distributions of pathologies between Unit 4 and these two residential units may have been

Table 35. Summary of data for individuals with osteoporosis.

Unit	Burial	Sex	Age
3	1	male	17-21
3	6	female	55-60
3	22	male	18-23
3	25	male	17-21
3	49	indeterminate	8-9
3	53	male	18-23
6	3	female	30-35
6	13	male	40-45
6	15	female	18-23
6	16	female	33-38
6	20	male	20-25
6	22	female	21-26
6	28	female	21-26
6	44	indeterminate	5-6
6	46	female	18-23
6	53	male	23-27
6	54	female	48-53
6	63	indeterminate	14-16
6	67	indeterminate	1 yr.

Table 36. The percentages of caries, abcesses, and antemortem tooth loss for Unit 3, Unit 4, and Unit 6.

	Unit 3	Unit 4	Unit 6	Total
No. teeth	521	168	697	1386
No. caries	101	19	151	271
Percent caries	19.4	11.3	21.7	19.6
No. individuals	25	9	33	67
No. sockets observed	546	171	701	1418
No. abcess	19	4	33	56
Percent abcess	3.5	2.3	4.7	3.9
No. individuals	25	9	33	67
No. teeth possible	792	177	614	1583
No. lost antemortem	95	8	78	181
Percent lost antemortem	12.0	4.5	12.7	11.4
No. individuals	25	9	33	67

related to social status and the activities incurred with that status. The high frequency of inflammation of the appendicular skeleton, degenerative joint disease, and healed fractures among Unit 4 individuals may be indicative of activities which were involved in acquiring or maintaining their status. The distribution of inflammation of the appendicular skeleton between Unit 3 and Unit 6 may be due to differential activities, such as occupation. This is suggested by the greater number of individuals in Unit 6 with inflammation of the appendicular skeleton. A division of labor between males and females was inferred from the distribution of healed fractures and degenerative changes affecting synovial joints. Osteoporosis of the skull may be related to the high infant mortality also in Unit 6. Since no differential in dental decay was observed, the notion that differential distributions in dental decay may reveal cultural factors associated with food selectivity and distribution is not supported.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND PROBLEMS

In summary, there are eight aspects of the results to be considered.

1. The plausibility that social classes existed at Chucalissa is suggested by the different residential areas. However, no significant difference was found in the frequency of grave associations between Unit 3 and Unit 6, though the burials of Unit 3 did have a greater number and variety of grave associations. There was no apparent difference in the distribution of utilitarian and non-utilitarian artifacts and decorated-effigy and plain pottery between Unit 3 and Unit 6. A uniform distribution of utilitarian and non-utilitarian artifacts might be expected if Unit 3 and Unit 6 were distinct social units, though this may also suggest there were no social differences between these residential groups. The social distinction between Unit 3 and Unit 6 is not clear, and the possibility remains that Unit 6, because its chronological affiliations are less well known than those of Unit 3 or Unit 4, may be earlier or later than the burials of Unit 3 or Unit 4.

2. Demographic data show that there was a higher infant mortality in Unit 6 than in Unit 3. This may be related to the uneven distribution of female skeletons in Unit 6. The higher frequency of osteoporosis of the skull

in Unit 6 than in Unit 3 may also be a factor associated with the relatively higher infant mortality of Unit 6.

3. Unit 4 was probably a high status burial locale. The greater variability in burial attributes and the presence of human bone as grave associations distinguish it from Unit 3 and Unit 6. The tallest males and females are found in Unit 4.

4. The fairly uniform distribution of pottery among males, females, and subadults of Unit 3 suggests that status may have been acquired at birth. The significant association of grave goods with adult status, however, suggests that the full social status may not have been realized until one reached adulthood. The greater variability in burial attributes among subadults points to their tenuous social position.

5. Evidence of artificial cranial deformation from Unit 3 and Unit 6 indicate that this practice may have been more popular among high status individuals. Four of the six individuals from Unit 3 exhibiting this feature have decorated or effigy pottery associated.

6. Mean stature for males and females was tested for significance by analysis of variance. For males, a significant relationship ($P < .025$) was found between tall stature and presumably low status males of Unit 6. This seems to be due to faulty sampling among males. Among females, no significant difference was observed ($P > .05$), though Unit 4 females tended to be the tallest.

7. Distributions of inflammation of axial skeleton, degenerative joint disease, and healed fractures are fairly uniform for Unit 3 and Unit 6, though inflammation of the appendicular skeleton was observed to have a higher frequency in Unit 6. This may be a reflection of differential activities associated with residence. A division of labor was noted between males and females from the distribution of healed fractures and degenerative changes affecting synovial joints. The high frequency of inflammation of the appendicular skeleton, degenerative changes affecting synovial joints, and healed fractures in Unit 4 attest to the restricted nature of Unit 4 and the activities participated in by members of Unit 4 possibly to acquire or maintain their high status.

8. The distribution of dental decay among Unit 3 and Unit 6 is fairly uniform. The notion that differentials in the distribution of dental decay might reveal cultural factors surrounding food selection and distribution is not supported. Small sample size probably accounts for the low percentages of dental decay in Unit 4.

From the results, one can conclude that the model of Natchez social structure is of limited value for interpreting the data from Chucalissa. There are two factors contributing to the inability to fit the model of Natchez social structure to Chucalissa. (1) There has been difficulty in defining the Natchez social organization and descent rules. Three different viewpoints have been discussed. Swanton (1911) first proposed a four class system, but later White, Murdock, and Scaglion (1971) suggested that a two class system would better describe the Natchez social structure. Tooker (1963) suggested that the Natchez social structure was composed of matrilineal clans, rather than classes. (2) There is a general difficulty in extrapolating historic data to prehistoric societies. The specific nature of this model tends to negate any predictive or explanatory value it may have.

Ford (1974:406) has suggested that Mississippian societies involved a principle of social ranking with a system of redistribution. Social status would probably have been based upon economic differences in which certain members of the society enjoyed differential rights of access to basic resources (Fried 1967). Two aspects of this generalization were considered from the archaeological and skeletal material. (1) Social interaction and relationships were inferred from burial data. (2) Pathologies were examined for distributions which may have been attributed to social interaction or relationships. This generalization was of little value for interpreting the data from Chucalissa. No clear evidence for social ranking was indicated by the archaeological and skeletal data, although Unit 4 may have been a high status burial area.

Two problems raised in this investigation merit consideration. The presence of subadults poses a problem, since it indicates that factors were operating which led to premature death. The apparent lack of consideration for subadult material in this investigation of pathology is not a bias of the writer, but was necessitated by the general lack of information on subadults. The elimination of subadults effectively reduced the sample of individuals by 41.4 percent. However, the future use of subadult material may prove useful in identifying the effects of differential treatment afforded individuals by status.

The problem of adequate sample size poses a problem for anthropological analysis. The basic familiarity with the data or the precise definition of what is to be tested are usually absent since most anthropological investigations deal with observational data. Most hypotheses advanced by anthropologists include an underlying assumption of causality created by a network of interrelated variables. Benfer (1968) has briefly considered the problem of sample size. Because of the underlying assumption of causality, the interpretation of significant differences or relationships will often be confounded by lurking variables, when a large sample is used. The possibility of accepting the alternative hypothesis for the wrong reasons will be enhanced. Benfer suggests the use of smaller samples and more variables to alleviate these problems.

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VITA

Ronald K. Robinson was born in Dayton, Ohio on April 30, 1951. He attended elementary school in Miamisburg, Ohio and graduated from Miamisburg High School in June, 1969. In September, 1969, he entered Miami University of Ohio. In August, 1971, he transferred to The University of Kansas, where he received a Bachelor of Arts degree with a major in Anthropology, May, 1973. In September, 1974, he entered The University of Tennessee and began study toward a Master's degree. This degree was awarded in December, 1976.

The author is a member of the Tennessee Anthropological Association and the American Association of Physical Anthropologists.