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To the Graduate Council:

I am submitting herewith a thesis written by Moira H. M. Wright entitled "A Metrical Analysis of the Morphological Relationship Between Prehistoric Dallas and Historic Cherokee Skeletal Populations in East Tennessee." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Anthropology.

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A METRICAL ANALYSIS OF THE MORPHOLOGICAL RELATIONSHIP BETWEEN PREHISTORIC DALLAS AND HISTORIC CHEROKEE SKELETAL POPULATIONS IN EAST TENNESSEE

A Thesis

Presented for the

Master of Arts

Degree

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ABSTRACT

The purpose of this investigation was to define and quantify the morphological relationship between prehistoric Dallas and historic Overhill Cherokee skeletal populations in east Tennessee in order to test two theories concerning Cherokee prehistory in the eastern Tennessee Valley. One theory states that the Cherokee did not arrive in the Valley until long after European contact; the other theory suggests that the Cherokee have possibly been occupying this area since as early as the Archaic period.

Methods of metrical analysis currently in use in physical anthropological research were used to test these two theories. The morphological distance between Dallas and Cherokee was compared with the distances between Dallas and various Muskhogean and Iroquoian skeletal populations. This was accomplished by the application of Penrose's "size" and "shape" distance statistic as modified by Rahman (1962) and by principal coordinates analysis.

Crania were chosen as the units of analysis and eight facial measurements were used in the final analysis. Males and females were analyzed separately. Several Dallas and Overhill Cherokee sites in east Tennessee were sampled and the crania were measured by the author. For comparative material, several sites in the Southeast and Northeast were sampled. Of this material, only one population was able to be measured by the author. Publiched means of the eight measurements were used for the remaining populations.

It was found for the males that the Dallas, Cherokee, and Thompson Village populations grouped together distinct from the Irene-Moundville-Koger's Island cluster and the separate Iroquois grouping. The female populations clustered in basically the same way but with two exceptions: (1) the prehistoric populations of the Iroquois group were found closer to the Irene complexes; and (2) the distribution within the Irene-Moundville-Koger's Island group was different and exhibited greater spread between populations.

In conclusion, the results can only be considered suggestive at best. However, the author feels that the data were explained better by one Dallas-Cherokee theory than the other. Within the framework of these particular data, the results of the morphological analysis are best explained by the theory that the Dallas people in east Tennessee were of Muskhogean affiliation and not the direct ancestors of the Iroquoian-speaking historic Overhill Cherokee. This would assume a recent arrival of the Cherokee into the eastern Tennessee Valley, but there was no way to determine in this analysis just when this might have occurred.

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CHAPTER I

INTRODUCTION

The origin of the Cherokee Indians in what is now east Tennessee has been a matter of controversy ever since Cyrus Thomas (1894:694) concluded that the Cherokee had occupied this region "from time immemorial." Previously, men like Bartram in 1779 (Van Doren, ed., 1940) and Haywood in 1823 (Rothrock, ed., 1959) had suggested that the Cherokee people were recent arrivals in east Tennessee. This idea prevailed until Thomas conducted his extensive mound excavations in the eastern Tennessee Valley in 1890-1891, and provided archaeological evidence that the Cherokee had inhabited the region for a long period of time. Although Thomas' evidence appeared convincing at the time, these two theories remained as explanations for the historic geographical location of the Cherokee in east Tennessee. The Cherokee had either just settled in their historic area when European contact was first made or they had possibly been occupying it since as early as the Archaic period.

Lewis and Kneberg (1946:17) have been the strongest supporters of a recent arrival of the Cherokee in the eastern Tennessee Valley, at least not "until long after white contact." This conclusion was based on the extensive and thorough investigations at the Hiwassee Island site at the confluence of the Hiwassee River and the Tennessee River. Occupations from the Woodland through the historic periods were discovered, but each was attributed to a different group of people migrating into

the area. In particular, the Mississippian Dallas culture was considered to be a prehistoric Creek intrusion into east Tennessee, the arrival of the people bearing this culture occurring sometime during the Mississippian period (Lewis and Kneberg, 1946:10).

Because the archaeological and historical research at the Hiwassee Island site was so thorough, Lewis and Kneberg's ideas continued to receive strong support until Coe (1961:59) proposed Cherokee occupation of their historic location from as far back as the Archaic period. Since this time, enough cultural material has come to light through archaeological investigations to strengthen Coe's position. These investigations include salvage excavations of historic Overhill Cherokee sites by The University of Tennessee in the Little Tennessee River valley and a research program instituted by the University of North Carolina in western North Carolina in search of the origins of the Cherokee cultural tradition.

I. STATEMENT OF THE PROBLEM

Although the evidence for a long development of Cherokee culture in North Carolina appears to be sound (Coe, 1961; Dickens, 1970), both the Lewis and Kneberg and the Coe theories about the age of the Overhill Cherokee in east Tennessee can be supported by the archaeological culture evidence. The present study was undertaken to see if one of these theories could be strengthened through an analysis of the skeletal material from east Tennessee sites and surrounding areas of the eastern United States. Specifically, methods of analysis used in physical anthropology were applied to skeletal populations from some Mississippian

Dallas and historic Cherokee sites in east Tennessee, and to Muskhogean populations in the Southeast and Iroquois populations in New York state. It was the purpose of this research to calculate the morphological distance between the prehistoric Dallas and the historic Cherokee skeletal populations, and to compare this distance with the distances between Dallas and various Muskhogean groups. Iroquois populations were included to see how they would compare with Dallas and Cherokee. An Iroquois linguistic affiliation for the Cherokee was established as far back as Barton's documentation in 1798 (Gilbert, 1943:314). The discovery of an Iroquoian-speaking group in the midst of Muskhogean-speaking peoples was the starting point for all the questions concerning the origin of the Cherokee in the Southeast. Therefore, it was felt that the study might be strengthened by the inclusion of Iroquois comparative material.

In comparing the morphological distances among the groups under analysis, it was hoped that physical evidence might be brought to bear on either one theory or the other. Previously, only archaeological and historical data have been used in the investigation of this problem (for example, Coe, 1961; Dickens, 1970; King, 1972). The author feels that by the use of physical anthropological data additional insights into the history and movements of particular groups of people can be provided. Actual human populations, whether living or skeletal, possess a genetic reality that is not quite as apparent in cultural data. The "only direct avenue for temporal studies of human groups lies in their skeletal remains" (Jantz, 1972:20). However, it is important for both archaeologists and physical anthropologists to realize that the skeletal

and cultural remains can provide the greatest amount of information when they are integrated. An attempt has been made in this study to provide new physical data in light of what is known archaeologically.

In recent years, multivariate statistical procedures have been used extensively in the study of skeletal populations. The applications of this method range from the study of patterns of difference among major human populations (Howells, 1973) to a microevolutionary analysis of six Arikara Indian villages covering a time span of 200 years (Jantz, 1970). It has become increasingly obvious that the construction of a metrical "profile" (Howells, 1969b:312) for a population is the best physical description of that population, for it is then treated as "an integrated whole, not as an inventory of separate figures" (Howells, 1969b:313). In the present study, Penrose's "size" and "shape" distance (Penrose, 1954; Rahman, 1962) was used to quantify the morphological relationships between pairs of skeletal populations selected for analysis. The resulting distances were further analyzed by principal coordinates, so that each population could be represented as a point in a bivariate space, while preserving as nearly as possible the original distances (Gower, 1972).

II. SIGNIFICANCE OF THE STUDY

As mentioned earlier, a continuous archaeological sequence for a long Cherokee occupation appears to have been established in the Middle Town area in western North Carolina (Dickens, 1970). This has again raised the question of the origins of the Overhill Cherokee in the Tennessee portion of the Appalachian valley. For this reason, any

study attempting to provide new data in the direction of answering this question can be considered worthwhile. Furthermore, by analyzing the skeletal material in order to determine morphological relationships and combining it with the archaeological evidences, the present research has made a pioneer step in this area of the Southeast. Although the results will only be suggestive rather than conclusive, they should raise many questions that can be investigated in the future.

CHAPTER II

REVIEW OF LITERATURE

I. ARCHAEOLOGICAL AND HISTORICAL PERSPECTIVES

The search for Cherokee origins both in the Southeast in general and in their historic location in particular has long been a source of interest for many archaeologists and historians. This interest is reflected in the extensive literature on the subject. Even more pertinent to this study is the literature concerning the two theories of Cherokee prehistory in east Tennessee discussed in Chapter I. Therefore, it is necessary to review archaeological and historical writings pertaining to the Cherokee occupation of the eastern Tennessee Valley.

Support for the theory of a recent arrival of the Cherokee in east Tennessee is found as far back at 1779 in the writings of William Bartram. Although Bartram was really not concerned with discovering from whence the Cherokee had sprung, on his trip through the Cherokee nation in 1779 he could not refrain from commenting upon the fact that the Cherokee were living upon "artificial hills" which had been built by the "red men" they had expulsed upon their arrival from the West, and that they knew nothing of the purpose of the mounds (Van Doren, ed., 1940:297). As Coe (1961:53) stated, "This statement had a profound effect upon the interpretation of Cherokee prehistory." Subsequent accounts about these Indians automatically assumed a recent arrival of the Cherokee into the western North Carolina-eastern Tennessee area. This is borne out in

Haywood's The Natural and Aboriginal History of Tennessee, published in 1823 (Ruthrock, ed., 1959). He had the Cherokee moving down from northeast North America, settling in the Appomattox area of Virginia, and about 1650, moving to the Holston River and later the Little Tennessee River in uninhabited Tennessee, where they settled upon the abandoned mounds. He even went so far as to postulate an Asiatic (Hindu, Hebrew, and northeast Asia) origin for the Cherokee people in the distant past (Gilbert, 1943:313).

The earliest attempt to reconstruct Cherokee prehistory was M. R. Harrington's work, "Cherokee and Earlier Remains on Upper Tennessee River" (1922). Harrington and his crew excavated several sites and mounds between the Little Tennessee River and the Hiwassee River establishing the first cultural sequence for that area and describing the material culture of the Overhill Cherokee. Again, a reluctance to assign antiquity to the historic Cherokee is found; for although three culture types were found overlying one another, each was attributed to a migration of new peoples: (1) "Round Grave" culture, probably of Algonquian affinity; (2) "Second Culture," the mound builders, possibly pre-Cherokee and possibly not; and (3) historic Cherokee. Harrington did not settle on one origin theory over another, but was more concerned with description and affinities. He did mention two of the more likely theories: (1) migration of the Cherokee from the west or the northwest at an early date, replacing the "Round Grave" people; and (2) recent migration from the upper Ohio valley after separating from the Iroquois, both theories being dependent on establishing the relationship of the "Second People" to the historic Cherokee.

Throughout his early work, Swanton (1922, 1928, 1935) asserted that the evidence suggested a southern movement from the upper Ohio valley in relatively recent prehistoric times (corresponding to Harrington's "Second Culture") with pressure into the mountains from the Iroquois to the north. This would readily account for the presence of the Cherokee on the Tennessee River when DeSoto arrived (Swanton, 1922:213). Later in 1946, Swanton described the arrival of the Cherokee in the Southern Appalachian highlands as an invasion from the northeast, pushing aside the Yuchi in east Tennessee, and beginning just prior to DeSoto's arrival in 1540 (1946:14).

Based on previous archaeological and historical accounts, David Bushnell traced the tribal migrations of the basic language stocks occurring east of the Mississippi River. The Iroquois were originally found west of the Mississippi River in the central valley close to the Caddoan speakers (Bushnell, 1934:11). Subsequent migrations found the Iroquois moving east to cover western Tennessee and Kentucky; then the Cherokee separated and travelled into West Virginia, Virginia, and northeast Tennessee, and finally, down the eastern Tennessee Valley (Bushnell, 1934:13-19). Unfortunately, Bushnell did not attempt to trace these movements through time, and it is difficult to determine just when the migrations might have occurred.

In 1938, W. S. Webb completed his extensive work on 23 sites in the Norris Basin. He basically agreed with Harrington: that each different occupation of the sites was due to different groups of people migrating into the eastern Tennessee Valley. Specifically, he felt that the Cherokee who had built the "circular town houses" did not arrive on

the Little Tennessee River and the sites on the Clinch and Powell Rivers until the last quarter of the seventeenth century. The earlier "large-log town house" and "small-log town house" peoples could only be due to different stocks of people because of the different house constructions. The former was attributed to possibly Muskhogean stock (Creek) and the latter, to the Yuchi(?) group. Although Webb admitted to the definite similarities between the material culture of the rectangular house builders and the Cherokee, he attributed this to adoption of the earlier culture by the Cherokee upon migration into the area (1938:376).

From the extensive work of Lewis and Kneberg (1946) at the Hiwassee Island site in east Tennessee, it became evident that the different divisions of the historic Cherokee (Overhill, Middle, and Lower Towns) would have to be considered separately in reconstructing their prehistory. Lewis and Kneberg's concern was with the Overhill Cherokee and they were convinced that these people never occupied the lower Hiwassee River or Tennessee River until long after white contact (1946: 17). They did not refute the antiquity of the Cherokee tribe in the Southeast, for in an earlier paper, Lewis (1943:311) said that there were indications that the "Cherokee were responsible for a series of cultures of antiquity which centered in Georgia and influenced both early Woodland peoples and later Mississippi Muskhogeans." However, Lewis and Kneberg (1946) felt that the Cherokee were late arrivals in the eastern Tennessee Valley. Argument with their interpretations of the archaeological evidence lies in the assignation of the Dallas culture to the Creek tribe and the Mouse Creek culture to the Yuchi tribe, both tribes being Muskhogean speakers (Lewis and Kneberg, 1946:10, 14). Interestingly

enough, Lewis (1943:311) revived the theory of the Southeast origin of the Iroquois speakers and subsequent migration to the north due to Muskhogean pressure. Furthermore, he felt that the Cherokee were originally displaced by the Mississippi Muskhogeans and pushed into the mountains, later to move down into the eastern Tennessee Valley in the eighteenth century. In a later paper, Kneberg (1952:198) expanded on this idea and postulated that the Cherokee, originally settled in the Carolinas and Georgia lowlands and related to the Yamassee of the coast, were pushed into the mountains centuries earlier than the seventeenth century, and became adapted to a highland environment. Gradually, the Greeks withdrew to the south and the Cherokee moved into the Tennessee Valley.

From an examination of Cherokee pottery from north Georgia, Caldwell (1955:277) concluded that the "Cherokee appear to have been late comers into Georgia and the greater part of east Tennessee, displacing Muskhogeans from both areas." He further noted that the Lower Towns were well established before the Overhill Cherokee ever began moving into the valley (1955:278).

Sears (1952, 1955) saw the eighteenth century Cherokee as cultural descendants of the late prehistoric Lamar-like complex. He accepted Lewis and Kneberg's conclusion of the Overhill Cherokee being intrusive, and felt that eighteenth century Cherokee culture developed in the Underhill area and later spread north (1955:147). However, he discounted the close relationship of Cherokee culture to Creek, and felt that the Cherokee were native to the Southern Appalachian province, whereas the Creek may not have been. In the "Symposium on Cherokee and Iroquois

Culture" (1961), in an editors' note on page 258, Raymond Fogelson pointed out the striking parallels between Cherokee and Creek culture and stated that the Cherokee appeared to be basically a Southeastern group with only a linguistic relationship to the Iroquois. He felt that they were not as marginal as Swanton (1928) supposed. However, Caldwell (1958) indicated that a crossing of cultural boundaries occurred in the east Tennessee area, putting this region on the periphery of the Southern Appalachian tradition. This might somehow have influenced the culture of the protohistoric and historic Cherokee as we know it.

The theory of a long occupation of the Cherokee in east Tennessee found its earliest support in the work of Cyrus Thomas. In 1890-1891, Thomas conducted his extensive excavations along the eastern Tennessee River and finally provided solid evidence that the Cherokee had built the substructure mounds found in this region (Thomas, 1894). Furthermore, he appears to have been the first archaeologist to assert "the occupancy of this region from time immemorial by the Cherokee" (Thomas, 1894:694). However, the concept of time depth during this period allowed much shorter portions of time for prehistoric cultural development than we now know to be the case. For Thomas (1894:18, 694) ascribed to the Cherokee an earlier settlement in North Carolina and West Virginia before moving into east Tennessee. Furthermore, he felt there were strong indications that the Cherokee were the authors of some of the principle works of Ohio (Thomas, 1894:18). This may be the source of the many later ideas which have the Cherokee migrating from the Ohio valley.

As early in 1798, Barton claimed an Iroquois affiliation for Cherokee speech, and in 1883, Horatio Hale pointed out the same similarities (Gilbert, 1943:314). In 1887, J. N. B. Hewitt definitely established the relationship of Cherokee to other Iroquoian dialects (Fenton, 1940:61). Unfortunately, for the elucidation of the Cherokee problem, this fact of Iroquois language association became established early in Cherokee research. This has caused undue emphasis to be placed upon the difference of the Cherokee language from other tribes immediately surrounding them, relegating other cultural similarities to a lesser position. However, Mooney (1900:17, 189) felt that this cleared up the place of origin of the Cherokee, being the headwaters of the Ohio, just south of the Iroquois who originated north of the St. Lawrence River and Great Lakes in eastern Ontario with the Hurons. Thus, he agreed with Hale that the "course of migration of Huron-Cherokee family has been from northeast to southwest" (Mooney, 1900:189). Having established that the separation had occurred, Mooney (1900:190) placed the event in time by concluding that it had to "antedate the formation of the confederacy of the Five Nations, about 1540." It is now estimated by linguists that the separation of the Cherokee from the remaining Iroquois tribes occurred about 3500-3800 years ago (Lounsbury, 1961:11). However, this estimate is based on glottochronologic counts using Swadesh's 200-word list which is derived from the romance languages, and should be considered as tentative.

Setzler and Jennings' report (1941) on the Peachtree site in western North Carolina provided evidence for a continuous Cherokee occupation from 1830 back to prewhite contact. More importantly, there

appeared to be close similarity to the later cultures at Hiwassee Island and to Harrington's three levels of culture for the upper Tennessee Valley, indicating strong evidence for a prehistoric Cherokee complex in eastern Tennessee also. Similarities of Etowah with Hiwassee Island suggested the same conclusion for northern Georgia. An interesting appendix to this report was written by T. D. Stewart concerning the skeletal remains. He mentioned two alternative possibilities: (1) cranial deformation present in the early historic population at Peachtree was never reported by the early travellers, possibly indicating a late arrival in the Southeast; and (2) the presence of ear exostoses in quantity in the Cherokee and absence in the Iroquois could not result from a recent separation (Stewart, 1941:97).

The recent literature concerning Cherokee origins strongly supports the idea of indigenous development from prehistoric cultures in all the Cherokee areas. The first definitive work on this subject was Coe's 1961 article, "Cherokee Archaeology." Coe (1961:59) concluded, "It seems hardly necessary to look for any recent migration of the Cherokee into their historic area. There is sufficient archaeological data to suggest that they were already occupying it by the close of the Archaic period."

In Dickens' (1970) study of the Pisgah culture in North Carolina, he demonstrated the classification of Pisgah (A.D. 1100 to ca. A.D. 1500) as definitely prehistoric Cherokee. Furthermore, he found numerous and striking similarities to Pisgah in the Dallas culture in eastern Tennessee, and felt that Dallas should be considered as protohistoric Overhill Cherokee. King agreed with these conclusions and from his

studies of aboriginal ceramics from eighteenth century sites in east Tennessee stated that "there is no ceramic evidence to suggest a complete replacement of the population in the Little Tennessee Valley at or near the beginning of historic times" (King, 1972:62).

II. RESEARCH ON METRICAL ANALYSES OF SKELETAL POPULATIONS

Although physical anthropologists have long been concerned with morphological relationships between different skeletal populations, early studies were almost always based on trait by trait comparisons. This results in a study of traits, rather than populations (Howells, 1973:2). After Fisher introduced the discriminant function in 1936, it became apparent that multivariate analysis offered a way to avoid this description of skeletal characteristics in a population. By setting up a matrix of measurements which contains the information for all of the individuals and all the attributes together, a population can be properly described (Howells, 1973:2). However, extensive population analyses have only been feasible since the advent of the computer age, so that multivariate analysis has recently become a popular approach to problems in physical anthropology.

In regard to skeletal populations, researchers have utilized multiple discriminant analysis in three general ways:

(1) the classification of individuals into known populations (for example, Weiner and Campbell, 1964; Giles and Elliott, 1962);

(2) the determination of distances among populations of major ethnic groups (for example, Rightmire, 1970b; Howells, 1966, 1973);

(3) the estimation of relationships among closely related populations in space or through time (for example, Giles and Bleibtreu, 1961; Hanna, 1962; Jantz, 1970, 1973).

The application of multivariate analysis to microevolutionary problems within North American Indians has received special attention in recent years (Bass, 1964; Bennett and Hulse, 1966; Jantz, 1970, 1972, 1973, 1974), and the present study has undertaken to apply these concepts to the specific area of east Tennessee.

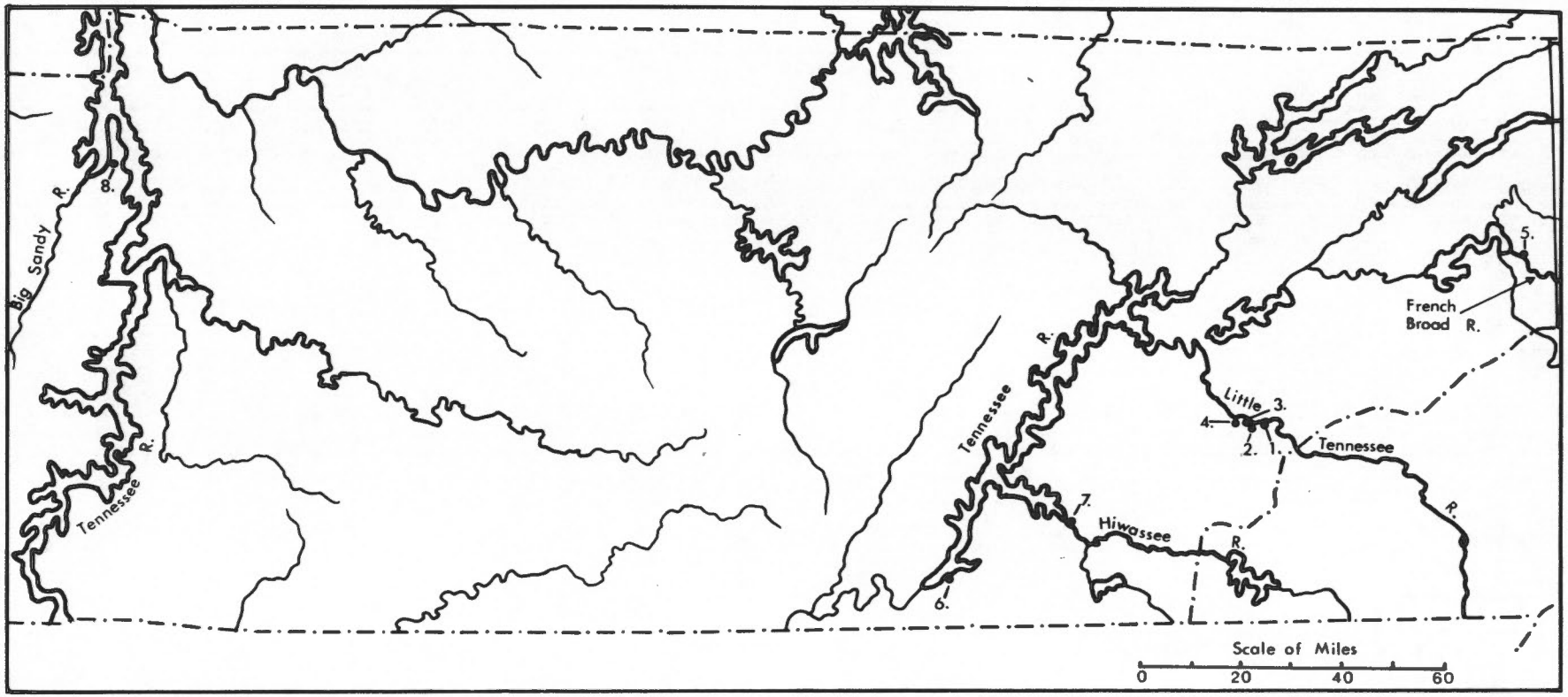
CHAPTER III

DESCRIPTION OF MATERIAL

Craniometry, or the measurement of crania, was selected as the means of expressing population variation in this study. Although post-cranial measurements and epigenetic traits of the skull have been used at various times to quantify this variation, the bulk of multivariate analysis has been performed using continuous metric cranial traits. With so many other aspects of this study being experimental, a sound basis for the analytical methods was essential. For this reason, crania were chosen as the units of analysis.

It was originally intended to sample crania from several Dallas and Cherokee sites in the Tennessee section of the Appalachian Valley province, and, as comparative material, historic Cherokee sites from the Middle Towns in western North Carolina and the Lower Towns in northern Georgia, and historic Creek and Iroquois sites from other areas of the eastern United States. Skeletal material representing both Dallas and Cherokee populations in east Tennessee was available at McClung Museum, The University of Tennessee. The sites which were sampled are described later in the chapter, and their locations are shown in Figure 1.

Unfortunately, the results of this study have been partially compromised because of inadequate comparative skeletal material. The author was refused access to the skeletal populations of the Cherokee Middle Towns housed at the University of North Carolina. Because this



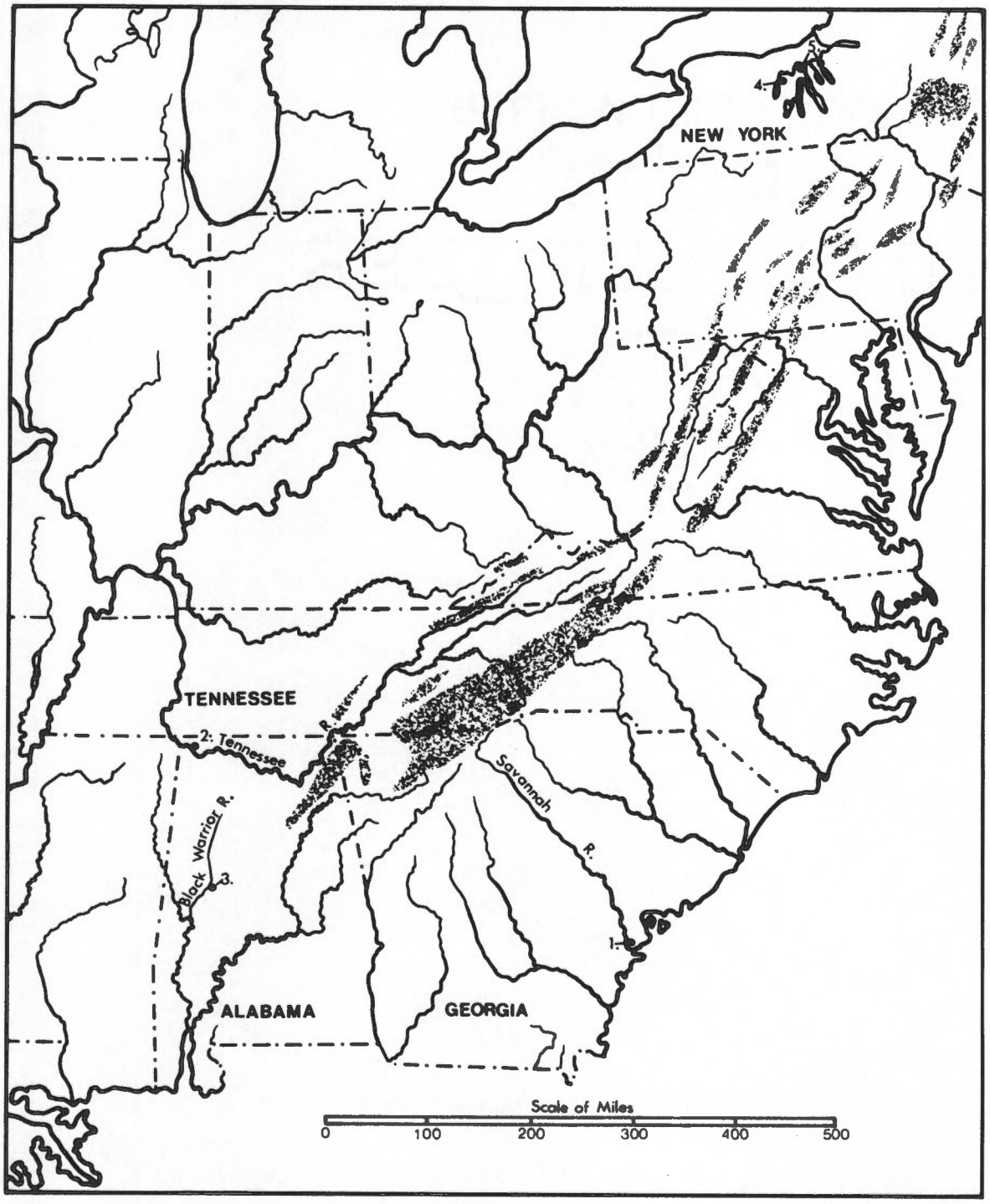
LEGEND:
1. Citico (40Mr7)
2. Chota (40Mr2)
3. Tanasi (40Mr62)
4. Tomotley (40Mr5)
5. Fain's Island (1Je1)
6. Dallas Site (7Ha1 and 8Ha1)
7. Hiwassee Island
8. Thompson Village (7Hy5)

FIGURE 1. Map of a portion of Tennessee showing both the western and eastern sites sampled.

area was of central importance in historic Cherokee times, and because there appears to have been a long, continuous occupation linking historic Cherokee back to the Woodland period (Dickens, 1970), the inclusion of a Middle Town Cherokee sample in this study was considered crucial. King (1972), Egloff (1967), and Dickens (1970) have all pointed out the ceramic differences between the Overhill and Middle Towns, and a physical comparison of these populations with the Dallas material in Tennessee was considered essential.

Extremely poor preservation of burials representing historic Cherokee at the University of South Carolina and the University of Georgia made the inclusion of Lower Town samples in the study impossible. This was also the case for the material from any historic Creek sites that has been excavated, although up to now there appears to have been relatively few of these sites investigated. An extensive search was made throughout the Southeast for well-documented historic Creek or Yuchi skeletal material, including visits to Moundville, Alabama, the University of Georgia, and the Smithsonian Institution, and no sample large enough for analysis was available. Concerning the Iroquois material, time did not allow for locating a sample to measure personally nor was permission available soon enough for the use of the raw measurements of Sublett's (1966) Seneca material. However, since the means were published in Sublett's dissertation, these were used for analysis. In the selection of all the crania for this research, an effort was made to choose only those burials from sites where there was good archaeological and/or historical documentation.

Because of the problems just outlined, adjustments had to be made in the selection of comparative crania. The original plan was to measure all crania myself, in order to keep researcher error to a minimum. This was not possible, so the best alternative was to use published means. Unfortunately, few, if any, researchers publish their raw measurements, so that in many cases a student is forced to use the published data, or the means of raw measurements. With this view in mind, several comparative populations were selected from the literature. Again, no historic groups of the tribes originally intended for sampling were available, so an effort was made to use prehistoric or protohistoric populations that would definitely not be Cherokee but had the greatest probability of being Creek or Muskhogean-speaking. Obviously, in assigning prehistoric cultures to historically-defined linguistic groups, one is dealing with assumptions. The basis for these assumptions is the study of material remains, but cultural similarity does not necessarily imply linguistic similarity. However, under the circumstances of this study, the best alternative was to use skeletal material that was assumed to be of Muskhogean affiliation on the basis of archaeological evidence and historical speculations. Throughout the study, these groups are referred to as Muskhogean. These Muskhogean samples are described later in the chapter and Figure 2 shows their location. Table I summarizes each cultural group and the number of crania in each.



LEGEND:
1. Irene Mound, Georgia
2. Koger's Island (Lu^{V} 92), Alabama
3. Moundville, Alabama
4. Two prehistoric Iroquois sites, New York
5. Two historic Iroquois sites, New York

FIGURE 2. Map of the eastern United States showing the location of the comparative Muskhogean(?) and Iroquois sites sampled.

TABLE I

DISTRIBUTION OF CRANIA AMONG CULTURAL GROUPS AND/OR SITES

Name	Abbreviation	Males	Females
Dallas	DA	20	13
Cherokee	CH	4	6
Thompson Village	TV	5	5
Irene Mound			
Mortuary Structure	MT	10	7
Burial Mound	BM	4	5
Koger's Island	KI	20	13
Moundville	MD	6	8
Prehistoric Iroquois	PRIRQ	7	10
Historic Iroquois	HIRQ	5	7

I. EAST TENNESSEE

Citico (40Mr7)

Citico is a village site containing two main components, an intensive and long late prehistoric Dallas occupation and a scattered and shorter 18th century Overhill Cherokee occupation (Salo, ed., 1969:26). It is situated on the west bank of the Little Tennessee River near the confluence of Citico Creek in Monroe County. This site was excavated by The University of Tennessee from 1967 to 1968, although in 1887, Cyrus Thomas had excavated the principal mound which contained both prehistoric and historic burials (Salo, ed., 1969:26). In The University of Tennessee excavation, the village area showed evidence of both occupations, but the mound contained primarily Dallas burials. Due to preservation, only two males and two females representing the Dallas culture could be used, and only one male and one female of historic Cherokee affiliation.

Chota (40Mr2)

Chota is a multi-component site on the west bank of the Little Tennessee River just downstream from Citico in Monroe County. Excavations were conducted by The University of Tennessee in 1939 and then from 1969 to the present (Gleeson, ed., 1970, 1971). Chota was the political capital of the Cherokee nation during the 18th century and was in existence from approximately A.D. 1725 - A.D. 1800 (Gleeson, ed., 1971:15). An earlier Mississippian Dallas occupation was slight, but Overhill Cherokee occupation was intensive. All the burials selected from this site were historic; these consisted of only three females.

Tanasi (40Mr62)

Tanasi is an historic Overhill Cherokee site situated downstream on the same river bottom as Chota and separated from it only by a creek (Gleeson, ed., 1970). From excavation evidence, it appears to be contemporaneous with Chota (Gleeson, ed., 1971:98). Tanasi was historically documented by Timberlake as being a Cherokee town (Gleeson, ed., 1971:98). By 1756-1760, Tanasi appears to have been declining and Chota increasing in both population and importance. Excavations at Tanasi were conducted by The University of Tennessee in 1972. Two historic Cherokee burials were available from this site, one male and one female.

Tomotley (40Mr5)

Tomotley was one of the smaller 18th century Overhill Cherokee towns on the Little Tennessee River just downstream from its confluence with Toqua Creek in Monroe County (Salo, ed., 1969:13). Excavations by The University of Tennessee began there in 1967 and continue to the present. The town seems to have been most intensively occupied during the first half of the 18th century and reached its peak about A.D. 1760 (Salo, ed., 1969:25). Three historic burials came from this site, two males and one female.

Fain's Island (1Je1)

This site consists of a village area and burial mound located on the south end of the island which is found in the French Broad River near Dandridge, Tennessee, in Jefferson County. The site was excavated in 1934 by T. M. N. Lewis and Charles G. Wilder of The University of

Tennessee, and had previously been tested in 1891 by Cyrus Thomas (1894). This site is a multi-component site with an intensive Dallas occupation (Lewis, 1934). Five Dallas crania came from this site, all males.

Dallas Site (7Hal and 8Hal)

This site is located on the east bank of the Tennessee River four miles from Harrison, Tennessee, in Hamilton County. The excavation was conducted by Charles Nash and The University of Tennessee in 1936 and the 7Hal number was assigned to the village area and the 8Hal number to the substructure mound. This site also showed an intensive Dallas occupation (Nash, 1936). Four male burials came from the village area and five male and seven female from the mound.

Hiwassee Island

Hiwassee Island is situated in the Tennessee River at the confluence of the Hiwassee River in Meigs County, Tennessee. Excavations were conducted there from 1937 to 1939 by The University of Tennessee under the direction of T. M. N. Lewis and Madeline Kneberg. This is a multi-component site with occupations from the Early Woodland period to the early 19th century (Lewis and Kneberg, 1946). The site consisted of a village area, several small midden areas, burial mounds, and a large truncated substructure mound. Only the Dallas component was sampled since there were too many questions surrounding the affiliation of the small historic component (Lewis and Kneberg, 1946). All the Dallas material selected--four males and four females--came from the village area.

II. WEST TENNESSEE

Thompson Village (7Hy5)

This site is situated on the west bank of the Tennessee River two miles below the mouth of Big Sandy River in Henry County, Tennessee. It was excavated by George Lidberg for The University of Tennessee in 1939. This site was selected for comparison with Dallas and Cherokee in east Tennessee. It is probably not attributable to Cherokee because of its location, and because cultural material recovered here seems to indicate a relationship with the Pickwick Basin Mississippian sites in Alabama, which are also outside the traditional Cherokee area (Lidberg, 1939). Webb (1952:115) noted that Chickasaw were in possession of west Tennessee by A.D. 1682. However, as far back as A.D. 1540, De Soto mentioned that the Chickasaw, whose cultural center was in northern Mississippi, recognized west Tennessee and western Kentucky as included in their territory (Webb, 1952:135). Webb (1952) provides archaeological evidence suggesting that the first Mississippian occupation at the Jonathan Creek site on the Tennessee River in Kentucky might be Chickasaw and the second one possibly Natchez. Both these occupations could be considered late Mississippian. It is suggested here that since Jonathan Creek was not too far north of Thompson Village, the suggestion of at least a Chickasaw affiliation might be applicable. Therefore, it seems that the Thompson Village population has a higher probability of being Muskhogean than of belonging to any other linguistic stock.

Thompson Village had Woodland and Middle Mississippi components and consisted of a village area covering several acres. The crania

selected for measurements were from the Mississippian occupation. (See Table I, page 21, for sample size.)

III. GEORGIA

Irene Mound Site

Irene Mound is located on the western bluff of the Savannah River about five miles from the city of Savannah in Chatham County, Georgia. It was excavated from 1937 to 1939 under the direction of Joseph Caldwell and Catherine McCann. This site was one of the largest on the Georgia coast and consisted of several components defined on the basis of the prehistoric ceramic chronology of the Georgia coastal area (Caldwell and McCann, 1941). The site was occupied almost to the historic period, the latest protohistoric component being represented by the Irene ceramic complex. The Irene complex had a widespread distribution in Georgia and along the coast (Caldwell and McCann, 1941:3), and was one of the two main components at the type site. The other major complex, Savannah, occurred just prior to the Irene manifestation. In a recent review of the Georgia coast chronology, Caldwell (1970) suggested an early data of ca. A.D. 1270 for the beginning of the Savannah complex. This is followed by Transitional Irene and then the Irene complex. No dates were assigned to these later complexes, although based on the Altamaha complex dates which succeed Irene, the latter manifestation probably ended by ca. A.D. 1550.

Although it is not possible to assign a particular tribal identification to this site, it seems very likely that a general Muskhogean affiliation is accurate (Swanton, 1922; Caldwell and McCann,

1941). Cranial material was selected from two of the site areas, the mortuary structure and the burial mound, corresponding to the Irene and Savannah complexes, respectively. Frederick S. Hulse measured and analyzed the skeletal material from the Irene site and this descriptive analysis was published as a section of the main Irene report (Hulse, 1941:57-68). However, the University of Georgia kindly made the original raw measurements available to the author. (See Table I, page 21, for sample size.)

IV. ALABAMA

Koger's Island (Lu^{V} 92)

This site consists of a village and a cemetery situated on an island near the eastern bank of the Tennessee River in Lauderdale County, Alabama. It was excavated from 1936 to 1938 under the supervision of William S. Webb and David L. DeJarnette (1942). There appears to have been two major components: an Archaic Shell Mound occupation, which was brief, and a later Mississippian occupation similar to the Moundville complex (Webb and DeJarnette, 1942; McKenzie, 1965). The Mississippian component shows a great deal of cultural similarity to many other prehistoric sites in the area historically occupied by Muskhogean-speaking groups. In particular, McKenzie (1965:170) noted that concerning burial patterns Koger's Island belonged to the Moundville phase, and that many burial accompaniments were similar to artifact types at the Moundville site. Furthermore, he discussed evidence for the Muskhogean affiliation of Moundville and pointed out that the Pickwick Basin sites were most closely related to Moundville (McKenzie, 1966). Therefore, there

appears to be a greater probability of Koger's Island being of Muskhogean affiliation than of any other stock. The published means from the Mississippian component were used in this analysis (Newman and Snow, 1942). (See Table I, page 21, for sample size.)

Moundville

This important site with its grouping of large and small flat-topped pyramidal mounds is located on a bend of the Black Warrior River in Hale and Tuscaloosa Counties, Alabama (McKenzie, 1966:3). Although Clarence B. Moore dug here in 1905-1906, the main investigations were conducted by the Alabama Museum of Natural History beginning in 1929. The means of the cranial measurements used in this analysis were taken from Snow (1941) who had measured the burials still partially in situ in the Mound State Monument Museum. This sample of the Moundville population probably belonged to the Middle Mississippi phase (Snow, 1941). McKenzie (1966) suggested a date of ca. A.D. 1250-1500, corresponding to the time span of the Moundville phase in northern Alabama. He also provided evidence for the general Muskhogean affiliation of this site (1966:52). (See Table I, page 21, for sample size.)

V. NEW YORK

Iroquois Skeletal Material

Sublette's (1966) Doctoral dissertation provided craniometric data (means) on Seneca Iroquois sites from the Genessee Valley, New York, covering a time span of 800 years. Two prehistoric populations (A.D. ?-1550) and two historic populations (A.D. 1670-1687) were selected

as comparative material. The majority of crania were gathered from private collections in upstate New York. Since Sublette was primarily interested in a physical description of a large Iroquois group, little archaeological and historical background was given for the individual sites. The sample sizes for the historic and prehistoric groups are given in Table I, page 21.

CHAPTER IV

ANALYTICAL METHODS

I. METRICAL DATA

When the author had originally planned to measure all the cranial material personally, 27 measurements were selected to be taken on each skull. These were based primarily on Howells (1973). With the necessity of having to use published metrical data, however, the number of measurements finally used was reduced considerably. Twenty-seven measurements were taken on the Dallas, Cherokee, and Thompson Village crania measured personally by the author, and these are on file for use as comparative material in the Department of Anthropology, The University of Tennessee.

Due to the limitations of using published data, eight cranial measurements were used in the final analysis. In the case of missing data, resulting from breakage or extreme warping, attempts were made in every instance to estimate the measurement according to Howells (1973: 34). If this was not possible, a mean based on the remaining crania in that particular sample was substituted for the missing measurement. This occurred infrequently and should have had little effect on diminishing variance and correlation (Howells, 1966:8). Because the sample sizes were small, except in the case of the Dallas material, the author could not afford to exclude any crania from the analysis unless a majority of measurements were missing.

The literature from which the comparative Muskhogean material was drawn dated to the late 1930's and early 1940's. At this time, physical anthropologists were more concerned with the cranial vault and cranial indices. As Howells' (1973) study has demonstrated, facial measurements discriminate better among populations, and it seemed desirable to use these measurements in this study. Since the literature dictated the selection of measurements, as many facial measurements as possible were used, thus placing the number at eight. Cranial length, breadth, and height were not used in order to avoid any effect of artificial lambdoidal and/or frontal flattening. Giles and Bleibtreu have demonstrated that "deformation is not a significant variable in the individual facial measurements," but is a "significant variable in the case of cranial length, breadth, and height" (1961:51). This cultural trait is found extensively in Mississippian skeletal populations from the Southeast.

The measurements, their abbreviations, anatomical landmarks, and sources of the measuring technique are listed below.

1. Bizygomatic breadth (BZB). From zygion to zygion (Bass: 1971:67).

2. Upper facial height (NP). From nasion to prosthion (Howells, 1973:175).

3. Nasal height (NH). From nasion to nasospinale (Howells, 1973:175).

4. Nasal breadth (NB). From alare to alare (Bass, 1971:68).

5. Orbital breadth, left (OBL). From ectoconchion to maxillo-frontale (Bass, 1971:69).

6. Orbital height, left (OHL). The maximum height from the upper to the lower orbital borders, perpendicular to the long axis of the orbit and bisecting it (Howells, 1973:175).

7. Palate breadth, external (PB). The greatest breadth across the alveolar borders, wherever found, perpendicular to the median plane (Howells, 1973:176).

8. Palatal length, external (PL). From prosthion to alveolon (Bass, 1971:70).

These techniques appear to match the ones used by the researchers in the literature consulted. In every case, the published data were defined by anatomical landmarks making comparisons possible.

All of the material selected from McClung Museum was re-sexed and re-aged by the writer according to Bass (1971) and McKern and Stewart (1957). Sex estimations for the other populations were simply trusted as being correct. This study was only concerned with adults and it seems certain that no errors were made in distinguishing adults from sub-adults, both in the literature and in personal estimation.

II. STATISTICAL METHODS

The various reasons for the superiority of multivariate analysis over univariate analysis have been discussed earlier. Within the scope of multivariate techniques, this study was concerned with finding the best statistical method to accurately describe the biological data. As in the case of the selection of measurements, the use of published data again dictated the choice of techniques. Since Mahalanobis' Generalized Distance (D^2) operates upon raw measurements (Mahalanobis, 1936), it is

obvious that a method involving calculations based on means had to be utilized. Recently, several researchers have investigated the results obtained from applying a D^2 distance statistic and Penrose's "size" and "shape" (C_H^2) statistic (Penrose, 1954) to the same populations. Corruccini (1973), Van Vark (1970, Jantz (1972), Rightmire (1970a), and Penrose (1954) have all noted very high correlations between D^2 and Penrose's C_H^2 statistic, ranging from r = .90 to r = .987. In the D^2 method, all correlations between variables are taken into account and this has been the main argument for preferring it to other statistical techniques. However, the studies cited above leave no doubt that almost identical results can be achieved by using C_H^2. C_H^2 is basically the same as Pearson's Coefficient of Racial Likeness (Pearson, 1926). However, Penrose (1954) breaks this mean square distance down into size and shape components (C_Q^2 and C_Z^2, respectively), and also considers intercorrelations (r) between variables. These intercorrelations can be represented by an average value (R) of correlations if observational data are available; if not, Penrose suggests a formula for a value of R from any set of d-values (differences in the mean values between any two populations). This new value of C_H^2 is called C_R^2. It is unclear as to whether the studies mentioned above calculated C_R^2 or C_H^2. If the latter were the case, then the correlations of D^2 with C_R^2 should be even higher. The common symbol for Penrose's statistic has been C_H^2, and if a researcher does not describe the formulae, then one is not sure which variation has been used. Rahman (1962) had modified C_R^2 (D_p^2) by working out the sampling distribution so that his formulae are comparable to D^2 numerically. C_R^2 is a mean distance and Rahman's D_p^2 is a summed distance.

In the present study, this modified D_p^2 statistic appeared to be the best technique to use.

Briefly, the calculation of D_p^2 involves:

1. The means for each measurement for each sample population.
2. Standardization of the measurements by dividing by the pooled sample standard deviation (S.D.).
3. The difference in mean values between pairs of populations.
4. The sum of the differences (Σd) and the sum of the differences squared (Σd^2) for each pair of populations.
5. The average value (R) of the correlations (r) between the variables.

The basic form of the two components of D_p^2 is:

$$\text{Size distance} = 1/p \frac{(\Sigma d)^2}{[1 + (p-1) R]} .$$

$$\text{Shape distance} = 1/1-R \left[\Sigma d^2 - \frac{(\Sigma d)^2}{p}\right]$$

where p = the number of measurements;

d = the difference between the mean values in any two populations;

R = mean r among variables.

The modified Penrose distance statistic (D_p^2) was calculated for nine populations using the facilities at The University of Tennessee Computer Center. The means for each population and the standard deviations for males and females were calculated using the CODEBOOK program

from the Statistical Package for the Social Sciences (Nie et al., 1970).

A distance matrix was constructed from the distances calculated by the "size" and "shape" program, and a further analysis was performed upon this matrix, principal coordinates analysis. Gower (1972:10) describes this analytical method as a way of expressing the distances between populations by representing these populations as points or coordinates displayed in a multi-dimensional space. This space is created by using orthogonal principal axes of the n points. "The most important principal axis preserves distance best in one dimension, the first two most important principal axes preserve distance best in two dimensions, etc." (Gower 1972:10). The starting point is a symmetric matrix (D) with zeros down the diagonal. The elements d_{jk} of D give the distance between all pairs of populations represented by points P_j or P_k; j and k take the values 1, 2, ..., n. In order to calculate the coordinates of each population with principal axes as coordinate axes, a series of transformations have to be made on the original distance matrix (D). These steps can be summarized as follows (Gower, 1972:11):

(1) Define a new matrix E with elements $-1/2\ d_{jk}^2$

(2) Create a new matrix F whose elements f_{jk} are

$$e_{jk} - e_{j.} - e_{.k} + e..$$

where $e_{.k}$ = the row

$e_{j.}$ = the column

e.. = the general means of E.

(3) Extract the latent roots and vectors (A and X) from F

$$FX = XA$$

(4) Scale the columns of X, so that the sum of squares of the jth column is λ_i, the ith largest latent root

$$\therefore X' X = A \text{ and } XX' = F.$$

Then the elements of the jth row of X are the required coordinates of P_j.

Hiernaux (1972) has effectively demonstrated that this analysis gives a very satisfactory two-dimensional representation of his biometrical data on living Sub-Saharan populations in Africa. Corruccini (1973) illustrates a slightly different version of the traditional latent root and vector statistical method, principal components analysis. He constructs a plot which effectively shows the relationships between seven hominoid groups.

The principal coordinates analysis was calculated by computer at The University of Tennessee Computing Center.

CHAPTER V

ANALYSIS OF DATA

The means for eight cranial measurements taken from nine populations are given in Tables II and III for males and females, respectively. The pooled standard deviations for males and females are also presented in Tables II and III. Standard deviations were calculated by computer from the raw measurements of the Dallas, Cherokee, Thompson Village, and Irene Mound cranial samples only because no standard deviations were presented with the published means. The average correlation coefficient (R) for the eight measurements was calculated from the same four populations. For these samples, R = .2563.

The size and shape components of the D_p^2 statistic are presented in Table IV. The visual representations of the shape distances, as computed by principal coordinates analysis, are illustrated in Figures 3 (males) and 4 (females).

I. INTERPRETATION OF INTERPOPULATION RELATIONSHIPS

The present study was conducted to investigate the two theories concerning the morphological relationship of the prehistoric Dallas people to the historic Cherokee: (1) that the Dallas people were Muskhogean-speaking, and a recent arrival of the Cherokee into the eastern Tennessee Valley forced the Dallas populations to migrate out of this area; and (2) that the Dallas people were prehistoric Cherokee and any cultural or physical differences between the former and the 18th

TABLE II

MEAN CRANIAL MEASUREMENTS (mm) OF MALES

	DA N=20	CH N=4	TV N=5	MT N=10	BM N=4	KI N=20	MD N=6	PRIRQ N=7	HIRQ N=5	S.D.
BZB	139.000	144.500	141.500	143.600	140.250	144.600	142.800	137.000	138.500	6.354
NP	70.950	70.500	70.900	71.444	71.667	75.800	77.000	74.500	70.500	5.462
NH	57.710	59.875	59.900	51.850	52.250	53.300	51.200	53.500	53.500	4.708
NB	27.100	28.125	25.300	25.200	24.250	25.300	25.200	28.000	28.500	2.027
OBL	41.200	41.500	40.500	39.778	39.250	41.000	41.800	39.500	38.000	1.550
OHL	36.750	37.875	34.800	35.300	34.750	35.400	34.800	34.000	33.000	2.043
PB	68.500	70.250	69.200	67.000	61.250	69.100	67.200	66.500	63.500	4.916
PL	57.100	57.000	57.900	56.126	50.332	54.700	55.000	56.500	56.000	4.003

NOTE: DA = Dallas; CH = Cherokee; TV = Thompson Village; MT = Mortuary Structure (Irene site); BM = Burial Mound (Irene site); KI = Koger's Island; MD = Moundville; PRIRQ = Prehistoric Iroquois; HIRQ = Historic Iroquois.

TABLE III

MEAN CRANIAL MEASUREMENTS (mm) OF FEMALES

	DA N=13	CH N=6	TV N=5	MT N=7	BM N=5	KI N=13	MD N=8	PRIRQ N=10	HIRQ N=7	S.D.
BZB	128.962	129.833	128.500	132.000	130.000	131.500	136.300	128.000	137.000	4.790
NP	67.083	65.167	62.750	70.750	67.000	64.000	70.700	65.500	69.500	4.438
NH	54.115	55.833	52.750	50.857	48.200	48.100	50.000	50.500	50.500	3.974
NB	25.808	26.667	25.000	25.000	24.000	24.700	26.200	26.000	28.000	1.870
OBL	39.346	39.083	38.250	37.600	36.500	40.400	39.800	37.000	36.500	1.689
OHL	35.846	37.167	33.000	35.714	34.000	34.000	35.000	33.500	34.000	2.158
PB	64.154	65.583	63.500	66.786	61.332	65.400	64.000	63.000	65.000	4.020
PL	53.692	54.197	54.876	53.000	52.750	53.700	54.800	52.500	53.500	3.242

NOTE: DA = Dallas; CH = Cherokee; TV = Thompson Village; MT = Mortuary Structure (Irene site); BM = Burial Mound (Irene site); KI = Koger's Island; MD = Moundville; PRIRQ = Prehistoric Iroquis; HIRQ = Historic Iroquois.

TABLE IV

SIZE AND SHAPE COMPONENTS OF D_p^2 +

	DA	TV	MT	BM	MD	KI	CH	HIRQ	PRIRQ
		0.054	0.562	2.611**	0.174	0.078	0.357	1.381*	0.434
DA	0.000	2.935	3.884**	4.916*	7.121**	5.164**	0.934	8.298**	4.718**
	0.584		0.267	1.912*	0.034	0.002	0.690	0.888	0.181
TV	2.629	0.000	3.999	6.003	8.076**	5.152**	4.063	9.461**	6.784**
	0.009	0.449		0.751	0.111	0.221	1.814*	0.181	0.008
MT	4.660**	7.379**	0.000	2.770	3.500	1.446	4.407	8.111**	5.185**
	1.500*	0.212	1.278		1.438	1.786*	4.899*	0.194	0.916
BM	4.242*	5.417	1.279	0.000	3.897	1.999	4.917	10.278**	6.910*
	0.129	1.264	0.206	2.511**		0.019	1.029	0.575	0.059
MD	5.526*	6.639**	4.414*	2.516	0.000	1.056	9.451**	14.215**	7.452**
	0.215	0.091	0.136	0.580	0.677		0.769	0.802	0.144
KI	5.410**	5.114**	0.061**	7.418**	3.819**	0.000	6.241**	11.625**	6.387**
	0.116	1.220	0.189	2.450	0.000	0.646		3.142*	1.578*
CH	1.134	3.556	6.820**	6.536*	9.373**	8.157**	0.000	9.037**	7.017*
	0.000	0.616	0.013	1.550*	0.115	0.234	0.102		0.267
HIRQ	12.010**	11.085**	6.710**	5.269*	6.682**	14.825**	13.143**	0.000	1.979
	0.904*	0.035	0.734	0.075	1.718**	0.238	1.667*	0.943	
PRIRQ	2.431	2.768	3.267	2.524	4.571**	7.303**	3.384	4.485**	0.000

*p < .05. **p < .01.

NOTES: The upper numbers refer to the size components, the lower numbers to shape. Males are above the diagonal, females below.

DA = Dallas; CH = Cherokee; TV = Thompson Village; MT = Mortuary Structure (Irene site); BM = Burial Mound (Irene site); KI = Koger's Island; MD = Moundville; PRIRQ = Prehistoric Iroquis: HIRQ = Historic Iroquois.

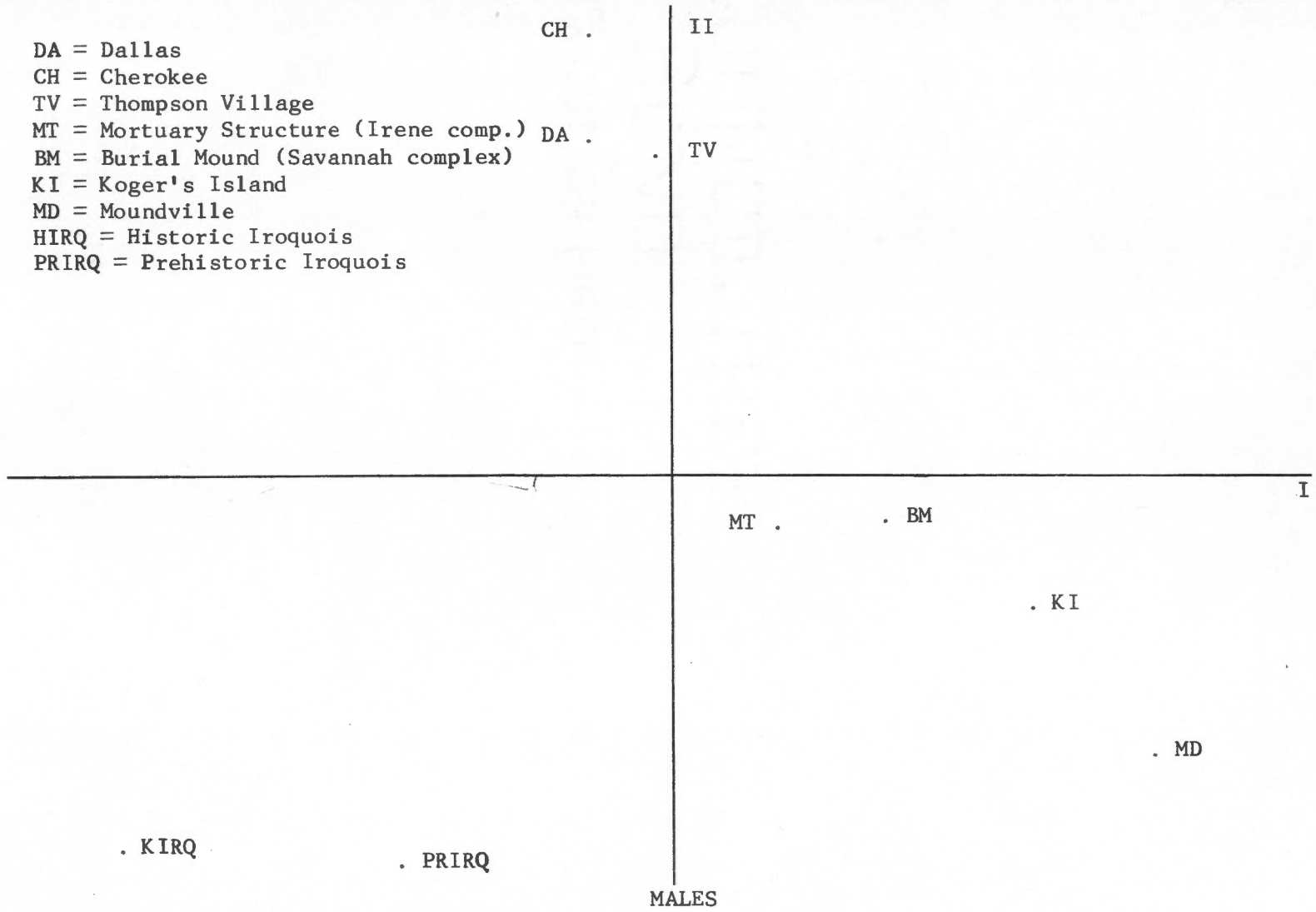


FIGURE 3. Plot of the first principal coordinate (horizontal axis) against the second principal coordinate (vertical axis) of the matrix of Penrose's shape distance. These two vectors account for 74.1 percent of the variance.

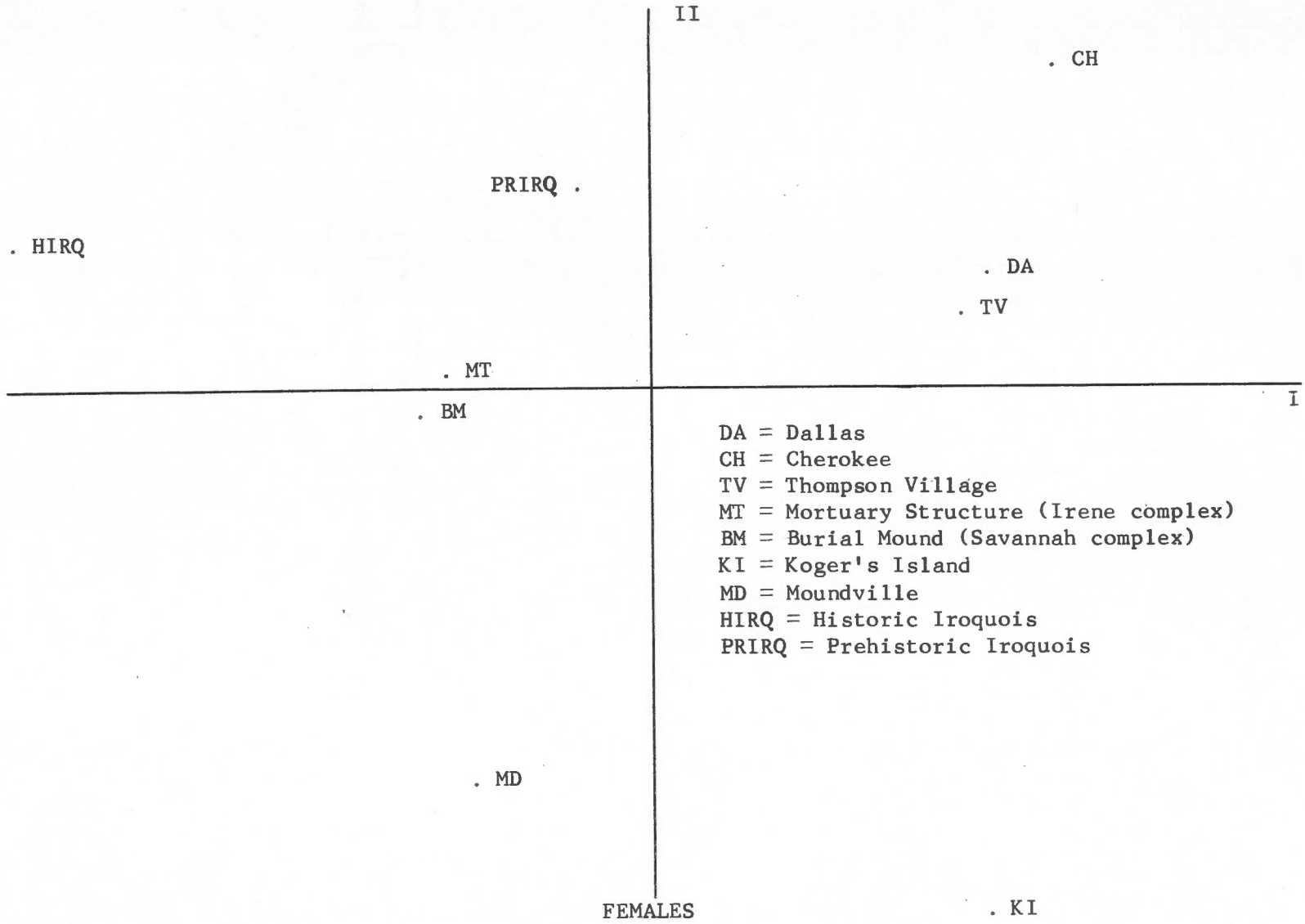


FIGURE 4. Plot of the first two principal coordinates of the matrix of Penrose's shape distance. These two vectors account for 72.6 percent of the variance.

century Overhill Cherokee could be accounted for by genetic change through time. It is necessary to examine the data presented in the tables and figures of this chapter in the light of these two theories.

II. MALE PATTERNS OF VARIATION

If one examines the distance plot (Figure 3), it is immediately apparent that the Muskhogean groups from Georgia and Alabama cluster together. The Dallas and Cherokee groups are found in a separate cluster from the Muskhogean groups. If the Dallas were prehistoric Cherokee, then the data seem to support this conclusion. However, the males from Thompson Village, a Mississippian site on the Tennessee River in west Tennessee appear closer to Dallas than do the Cherokee. At least one historic tribe in this area has been documented as Muskhogean-speaking, notably the Chickasaw(?) (Swanton, 1946; Webb, 1952). Both the shape distances between Dallas and Thompson Village and Dallas and Cherokee are not statistically significant.

The presence of the Iroquois groups equidistant from the Muskhogean and the Dallas-Cherokee clusters can be easily explained. According to linguistic evidence (Lounsbury, 1961) and archaeological evidence (for example, Coe, 1961; Lewis, 1943; Sears, 1955; Dickens, 1970), there appears to be support for the antiquity of the Cherokee in the Southeast area in general, and a lengthy separation from the Iroquois. Ritchie (1961:30-35) presents evidence for the in situ development of Iroquois culture within the tribe's Northeastern historic area. This would substantiate not only a long temporal separation from the Cherokee, but also a complete spatial separation as well. The clustering of the

Iroquois groups, distinct and distant from the Muskhogean populations, is expected on the basis of the two different linguistic stocks involved.

If one ignores the Thompson Village male population, then the morphological picture might suggest that Dallas was prehistoric Cherokee. However, it is difficult to explain the proximity of this west Tennessee population to the east Tennessee populations. Two possibilities can be considered. Firstly, that the Thompson Village population was not a prehistoric Muskhogean group. During the early Mississippian period, there appeared to be an extensive movement of cultural ideas, if not of people, throughout the Southeast. This diffusion from several areas including the middle Mississippi River Valley created a cultural homogeneity in the Southeast area (Caldwell, 1958:65-68). This pattern of cultural similarity in Mississippian times has tended to obscure the real relationships between physical populations. As Stirling pointed out, "close parallels or identities in material culture may be found in separate linguistic stocks" (1940:117). So there is still the possibility that the Thompson Village people were not Muskhogean-speaking, but of another linguistic stock with closer physical affinities to the Iroquois stock (if not actually Iroquois) than to Muskhogean. If this were the case, then one would expect a clustering of Dallas-Cherokee-Thompson Village separate from the Muskhogean groups. Within the former cluster, the smaller distance between Dallas and Thompson Village than between Dallas and Cherokee or Thompson Village and Cherokee might be explained by the contemporaneity in time of the two Mississippian groups. Thus, it could be suggested that the evidence of this study in regard to males supports the theory that the Dallas people were prehistoric

Cherokee and any differences between the prehistoric and historic populations were due to microevolutionary change.

An alternative explanation for the closeness of Thompson Village to Dallas is that Thompson Village was a Muskhogean population. This would suggest that the Dallas people were also Muskhogean-speaking and that the closeness of Cherokee to Dallas is attributable to gene flow between the two groups of people. The only difficulty here is that one cannot document evidence for admixture in prehistoric groups. For many historic tribes, there exists considerable data gathered by various white visitors such as fur traders, soldiers, etc. In many cases, these written documents relate accounts of White-Indian marriages as well as interbreeding between different Indian groups. Evidence for opportunities for gene flow is often provided by the documentation of historic tribal movements and the historic locations of tribes. For example, Swanton (1922) detailed the travels of DeSoto through the Southeast with many excerpts from the original chronicles. Mooney (1900) described in great detail the entire history of the Cherokee from the time of DeSoto's travels, including White-Cherokee contact, epidemics, and Indian raids. In regard to prehistoric groups, population movements are only speculative, even when based on ceramic similarities between sites.

If the Cherokee were recent arrivals in east Tennessee, at a time when population movements were probably occurring, then there would have been a period of approximately 200 years in which gene flow between groups in this area could have occurred. These migrations would not necessarily have had to entail large groups of people moving over vast areas, but possibly small-scale movements over a long period of time.

By A.D. 1700, the indigenous Dallas culture and intrusive Cherokee culture would have amalgamated to form Overhill Cherokee. Cultural ideas travel over space much more quickly than genes do, especially between linguistic stocks. Howells (1966), in studying living populations in Bougainville, found high correlation between biological and linguistic distances. However, it seems unlikely that the spread of ideas can occur without an accompanying movement of people if only on a small level. Therefore, if Dallas were Muskhogean, of the groups compared one would expect the Cherokee populations to fall closest to Dallas because of the opportunities for gene flow.

The ceramic similarities between Dallas and Overhill Cherokee as described by King (1972) could be explained by a blending of the two cultures. The author agrees with King (1972:62) that a "complete replacement of the population in the Little Tennessee River valley at or near the beginning of historic times" is unlikely. However, a more realistic explanation would be physical admixture of the two groups. Setzler and Jennings (1941:13) noted a well-known fact that "technology and material culture (archaeology's only data) are subject to the easiest change." By A.D. 1725, the beginning of the Overhill Cherokee period in east Tennessee as defined by archaeologists, a great deal of cultural similarity would be expected if contact had lasted for a few generations. However, biological distance would still be pronounced enough so that the Dallas populations would show closer affinities to a Muskhogean group than to the intrusive Cherokee. Swanton (1922) and Mooney (1900) documented the Cherokee as certainly having been in North and South Carolina in the mountains and along the Little Tennessee and Hiwassee

Rivers into southeastern Tennessee from the time of DeSoto.

The fact that Dallas is morphologically closer to Thompson Village than to the other Muskhogean populations might have a temporal explanation. Because all the Muskhogean sites in this analysis were excavated in the 1930's and 1940's, radiocarbon dates were not available in the original or later descriptions of the sites. Based primarily on ceramic sequences, Moundville and Koger's Island would date ca. A.D. 1300-1400 at their peak (McKenzie, 1966) and the two complexes at the Irene site from ca. A.D. 1270 to ca. A.D. 1550 (Caldwell, 1970). It seems likely that at least the Irene complex was still prominent after Moundville had been abandoned ca. A.D. 1450-1500. The Koger's Island and Moundville sites thus appear to have flourished earlier in time than the Irene complex. The Thompson Village site has been assigned to the late Mississippian period (Nash, 1934) making it contemporary with the major Dallas sites in east Tennessee. However, the other Muskhogean sites discussed above appear to have been progressively earlier. If the Dallas people belonged to the Muskhogean linguistic stock and particularly to the western tribes, and if they had arrived in east Tennessee in early Mississippian times (possibly accounting for the Hiwassee Island phase), then a closer relationship with Thompson Village than with the other Muskhogean populations in this analysis would be expected. Other archaeological data support this; namely, the Irene site appears to have been part of a long coastal sequence back to the Archaic period (Caldwell, 1970). Furthermore, the assumption that the Moundville and Koger's Island sites might be site-unit intrusions from the Lower Mississippi Valley west of the river (McKenzie, 1966:52), suggests an

even more distant relationship to other Muskhogean groups further to the east.

III. FEMALE PATTERNS OF VARIATION

Morphologically, the females present a somewhat different distribution. There is not the clear-cut separation of the Muskhogean groups from the Dallas-Cherokee cluster. Furthermore, one finds the Iroquois groups, especially the prehistoric Iroquois, in a peculiar position. The only apparent consistencies with the males are the Dallas-Cherokee-Thompson Village cluster and the closeness of the two Irene complexes. However, upon closer examination of the distance plot, the Dallas cluster is as far removed from the Muskhogean groups as in the males. The spread of the latter populations within their area of the genetic map obscures this relationship at first glance. There does not seem to be an adequate explanation for the large separation among the different Muskhogean(?) groups. In the discussion of the male distance patterns, a temporal sequence was suggested as an explanation with the earliest populations being farthest removed from Dallas. A problem now arises: why the females would demonstrate a large spread within the cluster but the males do not. The female shape distances between Irene and the other Muskhogean populations are all significant at either the .05 or .01 percent level. This is not the case with the male samples. None of the distances between the male Muskhogean groups is significant.

A possible explanation might lie in the matrilineal and matrilocal social organization which is documented for the historic

Muskhogean groups and especially for the Creek tribes (for example, Swanton, 1922). If sampling villages, one would expect the females within the village to exhibit much greater homogeneity because of the matrilineal and matrilocal kinship system. The net effect would be an increase in genetic differences between villages as reflected in the morphology of the crania. The opposite would apply to the males. They were probably moving around within a circumscribed area of geographically contiguous villages so that one would not expect large differentiation between villages or sites.

Despite these problems that appear in the analysis of the female samples, the author feels that the relationships between clusters and within clusters are basically the same as for the males, with the exception of the female prehistoric Iroquois group. There is still the question of the relationship of Thompson Village to Dallas and even to Cherokee. The same possibilities discussed in reference to the male samples can apply here. However, a further explanation is necessary for the position of the prehistoric Iroquois groups to the Irene site complexes. There is always the possibility of measurement error and when one is using published data, there is no way to correct for this. The sample sizes are adequate enough so that distortion of the real morphological picture should be very small. The closeness could also be due to chance for the distance between the mortuary population and prehistoric Iroquois is almost significant at the .05 percent level. As mentioned in Chapter III, the two prehistoric Iroquois sites are not well dated, but only known to be pre-1550 A.D. The mortuary and burial mound complexes certainly date earlier than A.D. 1550, and possibly as

far back as the thirteenth century for the latter complex (Caldwell, 1970). The Irene complexes and the prehistoric Iroquois sites might be contemporaneous or the prehistoric Iroquois sites might be earlier. The latter does not seem likely. Whether temporal proximity during the Mississippian period is a factor in this relationship is another question. According to Sublette (1966), Seneca movements out of their area did not begin until after A.D. 1550 and not extensively until post-1630 A.D. It appears then that there would have been no opportunities for gene flow between the prehistoric Seneca and the Irene people.

There is another possibility--that the Irene site was not occupied by Muskhogean-speaking people. In Swanton's (1922) account of DeSoto's, and later Pardo's, travels in the Southeast, no mention was made of a large aboriginal site at the mouth of the Savannah River in Georgia. However, it is possible that the site had been abandoned by the time the Spanish arrived in the Irene area (ca. early 1500's), since from A.D. 1500 on, there had been a great deal of upheaval along the Southeast coastal region. Swanton (1922:91-93) documented the Savannah River as being the dividing line between the Guale tribes to the north and the Cusabo tribes to the south. He felt that there was no doubt that both these groups were of Muskhogean stock, so it seems unlikely that the Irene site was occupied by any other linguistic stock. Caldwell and McCann (1941) felt that the ceramic and skeletal evidence definitely pointed toward Muskhogean affiliation for the Irene people. "The relative ceramic homogeneity of the protohistoric Irene-Lamar period in Georgia is very noticeable and is possibly the reflection of a trend toward integration which culminated in the later Creek confederacy"

(Caldwell and McCann, 1941:73). Thus, the evidence seems to indicate a Muskhogean affiliation for the complexes sampled from the Irene Mound site.

An interesting puzzle that appears in both the female and male plots is the wide separation of Dallas and Koger's Island. Both McKenzie (1965) and Faulkner (personal communication, 1974) have noted the great cultural similarity between the Koger's Island site in Alabama and the Dallas sites in east Tennessee. If one considered only archaeological evidence, there might be a case here for suggesting that the Dallas people and the Koger's Island population belonged to the same linguistic stock, possibly Muskhogean. However, cultural similarity does not imply genetic similarity and during the Mississippian period when so much cultural homogeneity existed in the Southeast, many linguistic boundaries could have been crossed by many ideas but not necessarily by large quantities of genes.

If the Dallas people had been Muskhogean intruders into the eastern Tennessee Valley ca. A.D. 1000-1100 and lived within a pattern of compact communities, then the relative geographical isolation from other Muskhogean groups and the settlement pattern would be expected to maximize random genetic drift and decrease the opportunities for gene flow. This would tend to increase the extent of the differentiation between the Dallas populations and other Muskhogean groups, especially if the Cherokee people arrived in the valley in the sixteenth century rather than ca. A.D. 1700. The relationships produced by the data in this study would not be surprising in the light of this explanation.

Although the prehistoric Iroquois females do seem to present a problem in interpretation, the author feels that, excluding this group, males and females compare favorably. It only remains to determine whether the data in this study provide evidence to support one theory of Dallas-Cherokee relationship.

CHAPTER VI

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY

The purpose of this study was to define and quantify the morphological relationship between prehistoric Dallas and historic Overhill Cherokee skeletal populations in east Tennessee. This was achieved by the application of multivariate statistical methods currently in use in physical anthropological research. Muskhogean and Iroquois skeletal material was included in the analysis in order to compare intergroup distances in general, and Dallas-Cherokee, Dallas-Muskhogean distances in particular. In order to determine if the Dallas-Cherokee distance had any reality, this distance had to be compared with a Dallas-Muskhogean one.

The results of this analysis can be summarized as follows:

1. The Dallas, Cherokee, and Thompson Village sites cluster together distinct from the Irene-Moundville-Koger's Island cluster.
2. The Iroquois male populations form a separate and distant cluster from the above-mentioned clusters. However, the prehistoric Iroquois female population appears closer to both the Irene complexes and to the Dallas cluster. It is difficult to explain this particular configuration.

3. The female Irene-Moundville-Koger's Island grouping shows a different distribution within the cluster than occurs in the male grouping. This might be explained by a temporal and geographical sequence of these sites as discussed in Chapter V.
4. Within the Dallas-Cherokee cluster, the Thompson Village population is consistently close to Dallas, with the morphological distance being statistically non-significant.
5. The female Cherokee population is twice as far from the Dallas-Thompson Village grouping as the male population. Since the female Cherokee sample is larger, this distance may be more realistic. This distance from Dallas is in a direction away from the Muskhogean Irene-Moundville-Koger's Island cluster.

II. CONCLUSIONS

It is necessary to briefly review these results in the light of the two theories concerning the Dallas-Cherokee relationship. The author feels that the data presented in Chapter V are best explained by a Muskhogean affiliation for the Dallas populations in east Tennessee. The proximity of Cherokee to Dallas can be attributed to admixture between the groups provided opportunities were available.

From A.D. 1540 onward, European movements throughout the Cherokee and Muskhogean areas increased in frequency in addition to the considerable aboriginal movements (Swanton, 1922, 1946; Mooney, 1900; Corkran, 1962, 1967). Trade routes increased and alliances between

Indian tribes shifted constantly. For example, in 1679 the Cherokee, Yuchi, and Creek allied themselves with the English against the Spanish missions in coastal Georgia (Egloff, 1967:20). Throughout the protohistoric and historic periods, there would have been ample opportunity for contact between the Cherokee in North Carolina and the Muskhogean Dallas people living in east Tennessee until population expansion and white pressure in the mountain areas forced portions of the Cherokee nation to spread out into the eastern Tennessee Valley.

In considering the Dallas as a prehistoric Muskhogean group, all the morphological relationships are adequately explained, except for the prehistoric Iroquois female distance.

Turning to the theory that the Dallas populations were prehistoric Cherokee, more inconsistencies appear in the data. One is now faced with accounting for the almost negligible distance between the Dallas and the Muskhogean Thompson Village population. The author feels that no satisfactory explanation will fit these facts. The opportunities for gene flow between Thompson Village and the Dallas people in east Tennessee would appear to be very slight, so that this explanation has little relevance in this situation. In light of the present archaeological and ethnohistorical data available, the probability of the Thompson Village site being Muskhogean is higher than it being affiliated with any other linguistic stock.

In conclusion, the morphological data produced by the metrical analysis of the selected populations in this study suggests that the Dallas people were probably Muskhogean-speaking and not the direct ancestors of the Overhill Cherokee in east Tennessee.

As mentioned in Chapter I, these comments are only tentative suggestions. There are many unknown and weak variables involved. Published means were used and most importantly, the comparative skeletal material was inadequate. Archaeological conclusions based on cultural sequences formed the basis of assigning the Muskhogean groups to that linguistic stock. In fact, the assumptions made in this study concerning the Dallas-Cherokee relationship are based on assumptions concerning the sites that were sampled for skeletal material. Furthermore, in order to demonstrate if physical differences are due to change through time, it is necessary to compare distances between prehistoric and historic populations. This was not possible because of the lack of historic Creek skeletal material. Also, good radiocarbon dates were not available for the prehistoric groups, and temporal control of the data was poor.

Despite these complications, on the basis of the skeletal material used in this study the results of the morphological analysis best support the theory that the Dallas people in east Tennessee were Muskhogean-speaking and the Overhill Cherokee intruded into the valley possibly sometime during the late prehistoric or protohistoric period.

III. RECOMMENDATIONS

This study has made a contribution to the physical anthropology of the Mississippian and historic cultures in east Tennessee. However, as mentioned earlier, the results are merely adequate due to the skeletal material available for study. The author would like to make some recommendations concerning this research in particular and physical anthropology in the Southeast in general.

1. The present study is only a starting point for evaluating Dallas-Cherokee relationships in east Tennessee. It is hoped that as more skeletal material becomes available both in this area and in the rest of the Southeast research into this problem will continue and expand. Especially important is the need for historic Creek material. The University of Georgia is excavating some sites at the present, and possibly other universities situated in the Creek area will begin a program soon.
2. If problems concerning prehistoric groups in the Southeast are to be solved, then all the institutions involved in archaeological, cultural, and physical research need to work together. It is very important that data be shared among researchers in order to get the greatest value from it. Researchers can bring different viewpoints to the same problem and advantage should be taken of this. It is hoped that in the future more emphasis will be placed on answering questions than on individual achievements.
3. Archaeologists and physical anthropologists working together gain the most information from a set of data. Hopefully, this combination of approaches will continue in east Tennessee and in the Southeast.
4. Although a summary of where skeletal material can be found is an ambitious project, it would be helpful if each university and/or museum possessed a list of exactly what

is available at their institution and the state of preservation of that material.

The potential for physical anthropological research in the Southeast is endless. The author hopes that the questions raised in this study have tapped some of this potential and will lead to many future physical analyses.

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