AN ANALYSIS OF SKELETAL MATERIAL FROM Bw°67,

Brunswick County, North Carolina

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Homes Hogue Wilson

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A Thesis submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Masters of Arts in the Department of Anthropology.

Chapel Hill

1982

Roy Dickens Jr.
Advisor

Julia G. Crane
Reader

Donald S. Brockington
Reader

William S. Pollitzer
Reader

HOMES HOGUE WILSON. An Analysis of Skeletal Material from Bw°67, Brunswick County, North Carolina. (Under the direction of JOFFRE L. COE.)

This thesis makes available data concerning the aborigines who inhabited the Lower Cape Fear River in North Carolina. The study includes an historical account of the Cape Fear Indians and paleo-osteological analysis of the skeletal material retrieved from a sand burial mound in 1963. This mound, known as the McFayden Mound, was located on the Cape Fear River in Brunswick County.

Attempts are made to date the mound and the occupation of the area. It is suggested that the mound dates between A.D. 1000 and A.D. 1400.

The analysis of the skeletal material includes aging, sexing, stature estimates, pathologies, and demographic studies. This section also contains detailed discussions of the techniques used for analysis.

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CHAPTER I

INTRODUCTION

Two outstanding characteristics mark the archaeology of the southeastern coastal plain of North Carolina. First, little is known about either the prehistoric or historic Indians of the Cape Fear area of North Carolina. The cultural affiliation of the prehistoric occupants of this region in southeastern North Carolina is still in question. James Mooney proposed that these inhabitants were probably Siouan as they had associations with other Indians known to be Siouan (1894:65).

Second, sand burial mounds were at one time numerous in the area. The affiliation and dating of these mounds is problematical even though they have been sporadically excavated since the late 1800s. One sand burial mound located in the heart of this area, known historically to have been inhabited by Cape Fear Indians in the 1600s, is the McFayden Mound (Bw^o67). This site was heavily disturbed by relic hunters, which led to excavation of approximately 450 square feet of the mound in 1962 by members of the Archaeological Society of North Carolina. Human skeletal material from these excavations has been in storage at the Research Laboratories of Anthropology at the University of North Carolina since that time.

More recent excavations at other sand burial mounds, Cd°1, the McLean Mound (MacCord 1966) and the Buie Mound (Wetmore 1978), as well as the excavation of an ossuary containing Siouan-type materials in New Hanover County, Nh^v28 (Coe et al.1982), provide an opportunity to assess the relationships of the population represented by the skeletal remains at McFayden with other burial mounds, with various Siouan and Algonquian groups, and with the historic Cape Fear Indians.

Analysis of the skeletal material from the McFayden Mound should provide information on the physical affiliation of the Cape Fear inhabitants, i.e., whether they are of Siouan or Algonquian stock. This data, combined with a study of ethnohistorical accounts and an analysis of artifacts associated with the McFayden Mound, should provide insights into the behaviors and patterns of the sand burial mound culture in the coastal plain region of North Carolina.

The first section of this thesis provides a synthesis of the historical accounts of the Cape Fear Indians from the early 1600s through the 1800s. Information concerning subsistence patterns, population size, number of villages present, and the participation by the Cape Fear Indians in the Indian wars of the early 1700s is provided.

The second section provides an account of the other sand burial mounds recorded and excavated in the North Carolina coastal plain, as well as other excavated sites (e.g., Nh^v28) that are considered pertinent to this inquiry.

Following this, the third section describes the archaeology of the McFayden Mound, including the excavation procedures used to retrieve the skeletal material, a description of the artifacts associated with the site, and the dating of the mound.

The final section, and bulk of this thesis, concerns the analysis of the human skeletal remains recovered from the mound. Among the questions dealt with here include patterning in the deposition of the skeletal remains within the mound; behavioral patterns evidenced in the processing and deposition of cremations; and determinations of age at death, sex, stature, morphology, and pathologies that are important to a paleodemographic reconstruction of the population. This data is compared with information gathered from other sites in the region to answer questions concerning the affiliation of the Cape Fear area Indians; the ethnic relationships of the Indians; coastal plain Indians and the sand burial mounds, and the nature of the prehistoric inhabitants represented by the Bw^{o}67 population sample.

CHAPTER II

HISTORICAL ACCOUNTS OF THE CAPE FEAR INDIANS

The native appellation and tribal affinity of the Cape Fear Indians remain unknown. S. A. Ashe suggests the Cape Fear people were the Congaree Indians of southern North Carolina (Ashe 1971:86), while other references to their tribal affinity include the Corees of the north and the Cheraw of the east (Sprunt 1896:54). With the exception of the Coree Indians (Mook 1944:218-219), all are known Siouan tribes. The Coree Indians, who inhabited areas along the Neuse River, were thought to speak a non-Algonquian language, but it is not known whether they were a Siouan group (Mook 1944:218-219). It is also believed that the Cape Fear Indians were named by the Europeans for the area they inhabited at the time of contact (Mooney 1984:66). In most cases researchers believe that these inhabitants were affiliated with Siouan tribes who occupied the area to the south (Swanton 1946:103, Mooney 1894:65, Speck 1935:190). This belief is due to known alliances and associations of the Cape Fear inhabitants with other Siouan groups notably the Catawba through the Waccamaws (Mooney 1894:65).

John Swanton suggests that the Cape Fear Indians may have been connected with the Waccamaw tribe primarily because of the close location of the Waccamaw River to the Cape Fear River (Swanton 1978:75). If the Cape Fear Indians were associated with the Waccamaw tribe, it follows that their linquistic connection will be with the Siouan stock, therefore increasing the chances of an affiliation with the southern Atlantic division. The southern Atlantic division is recognized as a loose confederacy of Siouan tribes that was led by the Catawba tribe in South Carolina. This confederacy was formed after the establishment of an English government (Milling 1940:203). There is little evidence that the Cape Fear Indians actually incorporated with the Catawba during their decline as Swanton and Milling suggest. Perhaps a more accurate proposal is that they maintained a separate existence within the English settlements (Mooney 1894:67).

While the Cape Fear Indians were probably encountered by numerous groups of Europeans, the first specific notice of them comes from narratives of a New England colony that settled near the mouth of the Cape Fear River in 1661. Soon after the arrival of the colonists, the Indians became the unfortunate victims of European exploitation. The Europeans began seizing the Indian children and sending them away under the pretense of instructing them in "civilized matters". In reality the colonists were probably using the children as slaves (Mooney 1894:66). The Indians, sensing the deceit, soon drove the New Englanders away from the area (Swanton 1946:75). In 1663, a colony from Barbadoes settled in the

Cape Fear area, but like their predecessors from New England, their stay was not permanent (Swanton 1978:75).

Perhaps the best account of the Cape Fear Indians and the area they inhabited occurs in the journal kept by Captain William Hilton. In 1664, Hilton and his crew sailed from Barbadoes with the intention of locating areas suitable for raising cattle.

> On Friday the 16th the winds being at N.W. we weighted and sailed up the Cape Fear River some four or five leagues and came to an Anchor in six or seven fathom; at which time several Indians came on Board, and brought us great store of Fresh-fish, large Mullets, young Bass, Shads, and several other sorts of very good well-tasted Fish (Hilton 1911-45).

On October 26, 1664, Hilton wrote that he and his crew traveled farther up the river in a small boat to an Indian plantation called by the Indians Necoes (Hilton 1911:46). The location of Necoes, the only village in this area that has a known Indian name, was estimated to be twenty miles from the mouth of the Cape Fear River. Swanton suggests that such a distance would place the village somewhere in Brunswick County (Swanton 1978:75).

Captain Hilton presented a detailed description of the land, flora and fauna along the Cape Fear River. In one area he observed land that was dry, well wooded and very level, covered with quantities of grass suitable for cattle. In contrast, he described other areas as being wet and marshy (Hilton 1911:47).

According to Hilton's description of the Cape Fear area, the woods and surrounding areas contained an abundance of deer, turkeys, partridges, cranes, and conies. Although none were seen, wolves could be heard howling in the woods. Along the river, there were ducks, teale, widgeon, geese, and parakeets. In his description of the flora, Hilton cited the oak tree as being most abundant. Other trees present in the woods and along the river included cypress, walnut, birch, beech, maple, ash, bay, willow, alder, and holly (Hilton 1911:47).

During one of their excursions along the river, Hilton's ship was approached by four Indians in a canoe who sold them several baskets of acorns before disappearing into the woods. One Indian, however, continued to follow the ship along the shore for two or three miles. This individual then shot an arrow toward the ship, barely missing one of the crew members, and disappeared into the woods. Hilton and members of his crew pursued the culprit. Their actions, upon finding him, describes well the attitude of the Europeans towards the hostile Indians in this area:

> So we proceeded down the River, till we found the Canoa the Indian was in who shot at us. In the morning we went on shoar and cut the same in pieces: the Indians perceiving us coming towards them, run away. We went to his hut and pulled it down, broke his pots, platters and spoons, tore his Deerskins and mats in pieces and took away a basket of Akorns (Hilton 1911:50).

The above was the only account of Captain Hilton to suggest that the Cape Fear Indians were hostile people. On the contrary, he usually found the Indians to be friendly, and often to signify peace with cries of "bonny bonny"

(Hilton 1911:51-52), a word perhaps introduced during previous Spanish contact (Mooney 1894:66). On one occasion, Hilton and his crew encountered another group of Indians. The chief, upon hearing of the unfortunate incident with the hostile Indian, made his humble apologies by showering Hilton's ship with beads and presenting him with two Indian women. Hilton described these women as being "very hansom proper young Indian women, the tallest that we have seen in this Country; which we supposed to be the King's daughters, or persons of some great account amongst them" (Hilton 1911: 51).

As mentioned earlier, Hilton's main objective in his expedition to the Cape Fear area was to find land suitable for cattle. Land for this purpose was eventually purchased from an Indian chief named King Wattcoosa (Hilton 1911:52). However, another reason for Hilton's travels in the Cape Fear area was to search for a herd of cattle thought to have been abandoned by the settlers from New England (Milling 1940:206). Hilton found the Indians quite protective of their cattle, refusing to allow other Indians near them. Yet Hilton and his crew were allowed to buy beef, which he describes as being "very good and fat Beef" despite the fact that they never were allowed to see the cattle (Hilton 1911: 52).

The next mention of the area in the historical records was in 1665. Sir John Yeamans led a group from Barbadoes to begin a settlement along the southern shore of the Cape Fear

River, later named Charlestown in honor of the King (Martin 1829:142). The specific location of Charlestown may have been at the mouth of Oldtown Creek in Brunswick County (Swanton 1978:75). John Lawson's map of North Carolina, surveyed in 1709, corroborates this placement (Lawson 1967: xxxviii). The location appears to be in Brunswick County on the southern bank of the river.

The settlers under the leadership of Governor Yeamans experienced more success in finding cooperative Indians than did the New England settlers. The Cape Fear Indians provided considerable assistance to Yeaman's colony in clearing and planting their lands (Martin 1829:142-143). Despite the friendliness of the Indians, the settlement of Charlestown was soon abandoned (Swanton 1978:75).

Not until 1695 were the Cape Fear Indians heard from again, when they contacted Stephen Bull to protest the enslavement of members of their community by Indians who were in alliance with the South Carolina government. The Indians petitioned to be placed under the protection of Governor Archdale of South Carolina. Their request was granted, and soon afterwards the Cape Fear Indians participated in rescuing fifty-two passengers from a New England vessel that had wrecked along the coast. The survivors of the accident eventually began Christ Church Parish, located north of Cooper River in South Carolina (Milling 1940:220).

During the early 1700s, there were many European and Indian conflicts in North Carolina. In 1711 the North

Carolina government made an appeal to the governments of both South Carolina and Virginia to receive aid in suppressing the restless Tuscaroras. Governor Gibbs of South Carolina called together an assembly which appropriated four thousand pounds for an expedition to aid North Carolina. The command was given to Colonel John Barnwell, a member of the House who was living near the Yamassee Indians (Milling 1940:117).

As soon as the necessary forces were convened, Barnwell and his army of thirty white men and nearly five hundred Indians began their departure for North Carolina. The troops were divided into three companies, in one of which were Cape Fear Indians. Barnwell led one company consisting of eighty-seven Yamassee, fifty-five Apalachee, ten Yuchi, and five Cusaba. The other two companies included a combination of Siouan tribes of eastern South Carolina. One company was Captain Jack's "Essaw Company", consisting of Santee, Wateree, Congaree, Catawbaw, Waxhaw, "Sagarees", and "Suterees". The other company, comprised of Wateree, Pedee, Cheraw, Winyah, "Hoopenga", "Warepees", Saxapahaw, and Cape Fear Indians, was led by Captain Stephen Bull (Milling 1940: 117-118).

An Indian census of 1715, completed prior to the Yamassee War, examined eight Siouan nations, giving the following information:

Name of Tribe	Miles From Charlestown	Villages	Men	Women & Children	Total
Catapaws	200 NNW	7	470	900	1470
Sarows	170 N	1	140	370	510
Waccamassus	100 NE	4	210	400	610
Cape Fears	200 NE	5	76	130	206
Santees	70 N	2	43)	60	125
			)		
Congarees	120 N	1	22)		
Weneaws	80 NE	1	36	70	106
Seawees	60 NE	1			57

(S.C. Records, B.P.R.O., VII 238-239: cited by Milling 1940: 222)

This information suggests that the Cape Fear Indians were still occupying the area along the Cape Fear River although no further reference to them has been found. In 1600, James Mooney estimated the population of the Cape Fear Indians to be a thousand (Mooney 1928:6). The large decline in the population to two hundred six individuals in 1715 can probably be attributed to the ravages of war and European diseases.

The Cape Fear Indians did not actively participate in the Yamassee War, which began in 1715. They did, however, serve on Colonel Barnwell's behalf as scouts and as guards in the Port Royal region during the war (Swanton 1978:75).

Another reference to the Cape Fear Indians dates to 1723. After the retirement of the Yamassee Indians to Florida, a Yamassee warrior named Istawekee remained in South Carolina and caused disturbances around the Port Royal area.

The Cape Fear Indians guarding this area and a group of Tuscaroras played a prominant role in attempting to capture the warrior. Barnwell ordered the Indians to seize Istawekee and his canoe. The Indians succeeded in capturing his canoe, gun, and trade goods, but Istawekee escaped (Milling 1940: 157).

The Cape Fear Indians who served as scouts to Barnwell in the Yamassee War are thought to have resettled in Williamsburg County, South Carolina. In May 1749, they petitioned the South Carolina Council for protection from the white settlers.

> Whereas a Complaint hath been made to his Excellancy the Governor in Council that the Indians commonly called the Cape Fear Indian are abused and drove from their hunting grounds by some White People living in those Quarters and whereas, the said Indians are under the protection of this Government these are therefore strictly to charge and require all Persons whomsoever not to disturb or molest the said Indians or any other, but as they are peaceable and innofensive People under the Protection of this Government to allow them freely and without Molestation or interruption to hunt as Heretofore (Council Journals of S.C. SVI 409: cited by Milling 1940:226).

In the latter part of the eighteenth century, approximately thirty Indians belonging to the Cape Fear and Pee Dee tribes were living in the parishes of St. Stephens and St. Johns under the leadership of King John (Milling 1940:229-230). By 1808 only one woman, a half-breed, remained to represent these two tribes (Swanton 1946:103).

CHAPTER III

BURIAL MOUNDS IN NORTH CAROLINA

Mounds in North Carolina reflect two different cultural patterns that are present in at least three different geographical areas. The two cultural patterns are differentiated by the use of temple mounds and burial mounds by aboriginal inhabitants. Shell middens and other refuse heaps should not be included in the "mound" category since they were unintentional accumulations (MacCord 1966:35).

In the mountain region of North Carolina, we find ceremonial dwellings built on top of large earthern mounds. This type of structure is known as a temple mound. The Garden Creek Mound No. 1, constructed by the Cherokees in Haywood County, is an example of this mound type (Dickens 1976:97).

Further east in the state, the piedmont region, once occupied by the late prehistoric Pee Dee Culture, also contains examples of temple mounds. The best-preserved example is the mound located at Town Creek Indian Mound State Park in Montgomery County. The only structural difference between the Garden Creek Mound and the Town Creek Mound is that the floor of the pre-mound earth lodge under the latter is not semi-subterranian (Dickens 1976:99).

The second type of mound we find in North Carolina is the small burial mound constructed of sand. This burial mound is typically found in the coastal plain region of the state, east of the fall line (Raleigh to Rockingham) and south of a line from Raleigh to Cape Hatteras (MacCord 1966: 37). This mound type constitutes a widespread cultural trait along the southeastern coast from the Neuse River in North Carolina on the north to Florida on the south. In order to draw conclusions about skeletal remains along the southeast coast and to evaluate the significance of the common cultural and physical traits reflected in their contents, a brief examination of these mounds will be necessary.

The locations of twenty-one burial mounds in the counties within the coastal plain region of North Carolina are as follows: Duplin (four mounds), Robeson (five mounds), Sampson (one mound), Cumberland (seven mounds), Wake (two mounds), Harnett (one mound), and Brunswick (one mound). These mounds, despite occurring over a wide area of southeastern North Carolina, are very similar. In 1883, Professor J. A. Holmes described the general characteristics of the thirteen mounds then known to exist.

> They are usually low, rarely rising to more than three feet above the surrounding surface, with circular bases varying in diameter from 15 to 40 feet, and they contain little more than the bones of human (presumably Indian) skeletons, arranged in no special order. They have been generally built on somewhat elevated, dry, sandy places, out of a soil similar to that by which they are surrounded. No evidence of an excavation below the general surface has as yet been observed. In the process of burial, the bones or bodies

> seem to have been laid on the surface, or above, and covered up with soil taken from the vacinity of the mound (Holmes 1916:19).

The earliest known "scientific" study of the sand burial mounds in North Carolina was by Professor Holmes in the 1800s. Although Holmes was trained as a geologist and not as an archaeologist, his records reflect a scientific attitude with an attention to detail.

Holmes' accounts of thirteen burial mounds located in various North Carolina counties (Duplin, Sampson, Robeson, Cumberland, and Wake) are mostly reports of the contents of the mounds with little description of excavation techniques. In only one account, Duplin County Mound No. 1, does Holmes relate the techniques used to excavate a sand burial mound.

> The excavation was made by beginning on one side of the mound and cutting a trench 35 feet long, and to a depth nearly 2 feet below the general surface of the soil (5 feet below top of mound), and removing all the soils of the mound by cutting new trenches and filling up the old ones. In this way all the soil of the mound, and for two feet below its base was carefully examined (Holmes 1916:19-20).

Despite a general lack of detail in his records, Holmes' descriptions of skeletal placement and position was surprisingly accurate, with information on secondary burials in cremated and disarticulated form, primary flexed burials, and bundle burials (Holmes 1916:19-24).

In Duplin County, Holmes observed four burial mounds. Duplin Mound No. 1, measuring thirty-five feet in diameter and three feet in height, was located in Kenansville. No stratigraphic layers could be recognized within the mound, but quantities of human bone and artifacts were found. The artifact content of Duplin Mound No. 1 included fragments of charcoal, pottery sherds, and small shells believed to be Marginella beads. The few pottery sherds present were generally "scratched" and "cross scratched" on one side. Although the partial remains of sixty individuals were excavated, only two skulls were complete enough to allow for cranial measurements. Fragments of burned bone were also found, but their poor condition prevented the proper analysis to determine whether they represented cremations (Holmes 1916:20-21).

Duplin Mound No. 2 was located approximately two miles east of Hallsville, North Carolina in an elevated, dry sandy region. The diameter of this mound was twenty-two feet with its height being three feet. One half of the mound was excavated, exposing charcoal fragments, pottery sherds similar to those found in Mound No. 1, and the skeletal remains of eight individuals. Root disturbances, observed frequently throughout the mound, no doubt contributed to the poor preservation of the skeletal material. The indices of one cranium, however, could be measured (Holmes 1916:22).

Duplin Mound No. 3, positioned on a similar sand ridge less than one-third mile east of Hallsville, may be standing today. As of 1883, this mound had not been excavated, but Holmes reported the diameter and the height as thirty-one feet, and two and one-half feet respectively (Holmes 1916: 22).

Duplin County Mound No. 4 was partially excavated by Holmes, producing human bones as well as charcoal fragments and pottery sherds. This mound was circular, with a base diameter measuring 35 feet. The height was 2½ feet above subsoil. The mound was positioned on a sandy ridge, and there was a borrow pit nearby. Holmes observed:

> Around the mound, extending out for a distance varying from 5 to 10 yards, there was a depression, which, in addition to the similarity of soils mentioned above, affords ground for the conjecture that here, as in a number of other cases, it is probable the mound was built by throwing on of soil from its immediate vacinity (Holmes 1916:22).

For Robeson County, Holmes described five burial mounds. The average diameter of these mounds was sixty feet and the average height was two feet. All of these mounds were situated on top of elevated, dry ridges located near water systems and all possessed human skeletal remains (Holmes 1916:23).

One of the Robeson County burial mounds had been excavated in 1882 by Hamilton McMillan. This mound supposedly contained the post-cranial remains of fifty individuals, but no teeth or skulls. A number of the post-cranial remains were observed to have been subjected to heat and/or the direct flames of a fire, indicating possible cremation. Aside from the skeletal remains, one stone celt was found in the burial fill (Holmes 1916:23).

In Sampson County, a burial mound measuring forty feet in diameter and approximately four feet in height was partially excavated, uncovering the fragmented remains of sixteen individuals. These remains were located in three different areas within the mound. Further analysis indicated that the skeletons of these individuals were disarticulated prior to interment as different parts belonging to the same individual were found in more than one area. None of the skeletal remains were buried below the surface of the ground and all exhibited signs of decay. Also present in the mound were Margenella beads (Holmes 1916:23).

Seven burial mounds have been observed in Cumberland County over the last century. Holmes reports on two of these mounds, the first of which was located ten miles south of Fayetteville, North Carolina. This mound contained the heavily eroded remains of one individual. The second mound, excavated by Hamilton McMillan in 1860, was located ten miles southwest of Fayetteville on a high, sandy ridge. This burial mound, containing a large number of adult skeletal remains, had a diameter of twenty feet and rose two and one-half feet above the surrounding ground surface (Holmes 1916: 24).

Charles Peabody wrote in 1910 of four more burial mound excavations in Cumberland County. Two of the mounds were known as the Hope Mills' Mounds; the other two were called the Duncan Shaw Mounds (Peabody 1910:429).

Hope Mill Mound No. 1 contained the remains of about sixty individuals. The poor condition of the skeletal material hindered any analysis to determine the exact number of individuals represented in this burial complex. The mound itself was irregular in shape, measuring fifty feet long, forty-three feet wide, and two feet high. Artifacts removed from the fill during excavation included a stone celt, a quartz projectile point, a pipe fragment, a platform pipe, and various projectile point fragments and chips (Peabody 1910:429-430).

The second Hope Mills Mound also was irregular in shape measuring twenty-seven feet long, seventeen feet wide, and one foot high. The contents of this mound included numerous human bone fragments and cylindrical copper beads. No analysis of the human remains was attempted (Peabody 1910:433).

No measurements of the two burial mounds situated on the Duncan Shaw estate were listed in Peabody's account. The two mounds were significant, however, in that they both contained portions of cremated skeletal remains which, according to the white color and mineral state of the fragments, had been reduced by exposure to intense heat (Peabody 1910: 433).

The McLean Mound ($Cd^{o}1$) was located on a sandy ridge in Cumberland County and was excavated during the early 1960s. At the time of excavation, the almost circular mound measured sixty feet along a east-west axis and fifty-five feet along the north-south axis. The top of the mound was estimated to be approximately three feet above the original ground surface. The mound had been heavily disturbed by previous excavation attempts and reports indicate that the mound once stood over six feet high in 1925. The artifact content of the McLean Mound included triangular points, celts, hammerstones, an abrading stone, stone and clay pipes, plain and fabric-impressed pottery, stone gorgets, and beads of both shell and bone. (MacCord 1966:36).

Burials of different types were found within the mound fill. These types included cremations, bundle burials, multiple burials, and flexed burials (MacCord 1966:36). The condition of the human bone found in the burial was reported to have been quite poor due to erosion. An analysis of the burial remains suggested that 268 individuals were present in the mound complex, many of them having been cremated. Although a rather large number of individuals were possibly interred in this burial complex, only 11 skulls were well enough preserved to allow for measuring cranial indices (Stewart 1966:67-81).

In his article, Holmes also described two burial mounds in Wake County. One mound was located seven miles east of Raleigh on the Neuse River, and a second was found ten miles south of Raleigh on a small plateau covered with original pine growth. Measuring 14 feet across and 2 feet above the ground surface, the second mound contained charcoal and randomly placed human bone. The skeletal remains exhibited much decay but analysis suggested that twelve individuals were represented (Holmes 1916:24).

The excavation of the Cameron Mound, located on a sandhill in Harnett County, North Carolina, led to the recovery of the skeletal remains of nearly 100 individuals. The burial mound exhibited signs of disturbance, but a careful survey, taken in 1929, indicated that the original dimensions may have reached 30 to 35 feet in diameter and 15 feet in height. A subterranean depth of three feet was also estimated. Artifacts recovered from the Cameron Mound include shell beads, two pipes and various fragments, one triangular projectile point, mica fragments, and one green bannerstone (MacCauley 1966:46-47).

Turning to the coast, another burial mound was excavated in North Carolina in 1962 in Brunswick County. This was the McFayden Mound site, located on the west bank of the Cape Fear River approximately 20 miles from Wilmington (on State Route 1427). Situated on top of a natural sandy ridge, the site could be seen rising above the surrounding area about two and one-half feet. The mound's diameter measured 40 feet. The disturbance of the area by relic hunters hints that the mound may have contained numerous artifacts at one time. For this reason, the mound was partially excavated in 1962 in an attempt to preserve the data present in the remaining undisturbed portions, and to contribute to the archaeological record of the Cape Fear Indians (South 1962:2-3).

The partial excavation of the McFayden Mound uncovered a number of artifacts and burial types. Artifacts found within the burial fill consisted of triangular points, celts, fabric-impressed pottery, stone gorgets, and tubular shell beads. Multiple and bundle burials were observed, along with evidence of cremations (South 1962).

The analysis of the skeletal remains retrieved from the McFayden Mound forms the basis of the remainder of this thesis. It is important, however, to note that the condition of the skeletal remains from all the burial mounds in the coastal plain, including the McFayden Mound, are poor and quite decayed. Such conditions limit the usefulness of the cranial and post-cranial indices from populations represented in these sites for comparative studies with the population represented in the McFayden Mound. In order to compensate for this limitation, cranial indices and post-cranial indices from representative samples from coastal sites in North and South Carolina, and sites in Piedmont North Carolina will be used (Figure 1).

The coastal populations used for comparison come from $Nh^{v}28$, an ossuary located along the Cape Fear River in New Hanover County. This site dates to the Late Woodland period, and the physical type suggests probable Siouan stock (Coe et al. 1982:31,70). A second population from a burial mound in Cumberland County, the McLean Mound ($Cd^{o}1$), is also compared with $Bw^{o}67$. The affiliation of this population is unknown, although it is suggested (Stewart 1966) that the long skull shape characteristic of this population is wide spread to the north along the inner coastal zone of the middle Atlantic states. A small number of samples of this physical type have been reported from a few places in the Piedmont (Stewart 1966:74). It is possible that these

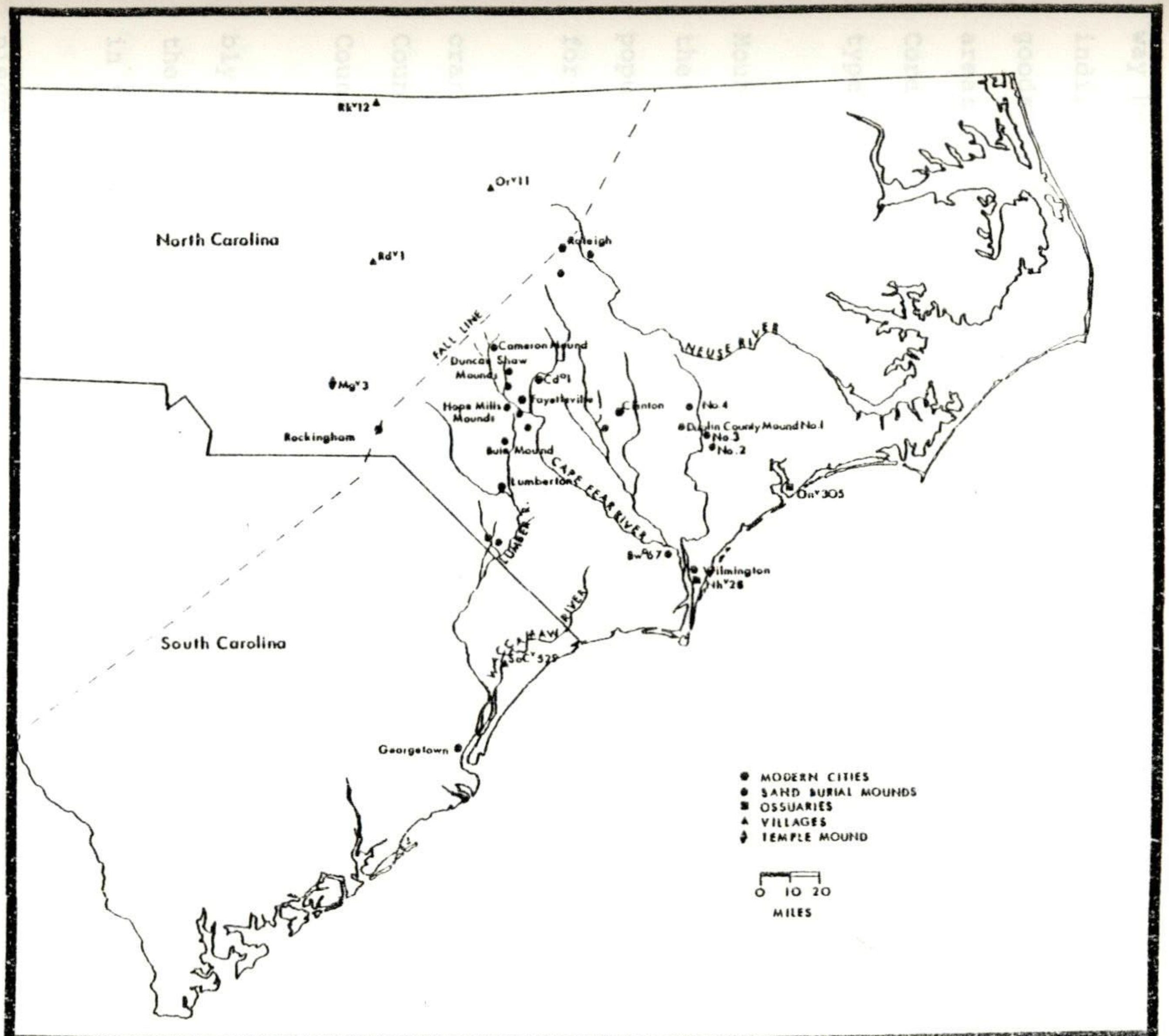


Figure 1.---Site locations

"longheads" represent an Iroquoian (or perhaps Algonquian) population that moved down from the north and settled along the Cape Fear River. Since these people were situated midway between the coast and the mountains, they had direct or indirect contact with both regions as evidenced by material goods in the mound fill of $Cd^{o}1$ that had originated in those areas. This site has a radiocarbon date of A.D. 1000 (MacCord 1966:43), but it may date later since smooth Catawba-type pottery is present.

Three previously measured crania from the Duplin County Mounds No. 1 and No. 2 (Holmes 1916:21-22) were included in the comparative sample. The ethnic affiliation of this population is uncertain. However, measurements and indices for the Duplin County material favors a Siouan stock.

Also from the North Carolina coastal region are two crania, probably of Algonquian stock, from Onslow and Pender Counties. And post-cranial remains from a site in Onslow County, $On^{v}305$, are used for stature comparison.

From the South Carolina coastal plain a sample, possibly Siouan, from a historic site ($SoC^{v}529$) located along the Waccamaw River (Trinkley and Hogue 1982:15) is included in the comparative sample.

Siouan population samples from sites located in the piedmont region of North Carolina include one prehistoric Dan River population, $Rk^{v}12$, and two historic populations from the Siouan villages of Keyawee ($Rd^{v}1$) and Occoneechi ($Or^{v}11$(Coe et al. 1982:67).

CHAPTER IV

ARCHAEOLOGY OF THE McFAYDEN MOUND

The McFayden Mound was situated on a natural sand ridge, and was visible on a small rise above the surrounding area. It was located near the Cape Fear River in Brunswick County, about 20 miles northwest of Wilmington, North Carolina. Although most of the mound had been disturbed, partial excavation of the remainder was undertaken in 1962 by Stanley South, with the Lower Cape Fear Chapter of the Archaeological Society of North Carolina under the direction of Stanley South, as a salvage project in February 1962. Further work was done on the mound in September of the same year.

A grid was first established from a north-south base line as denoted by two iron stakes placed north of the mound and fifty feet apart. The southern-most stake was designated as the datum, and served as the zero point. Thus, 10 feet north and 20 feet to the left of the zero point would be point 10L20. This number system was used to designate the southeast corner of the excavated squares (South 1962:3). The grid system and the excavated squares are shown in Figure 2.

Eight squares were excavated in the mound, and features were numbered within each square. Burial numbers were

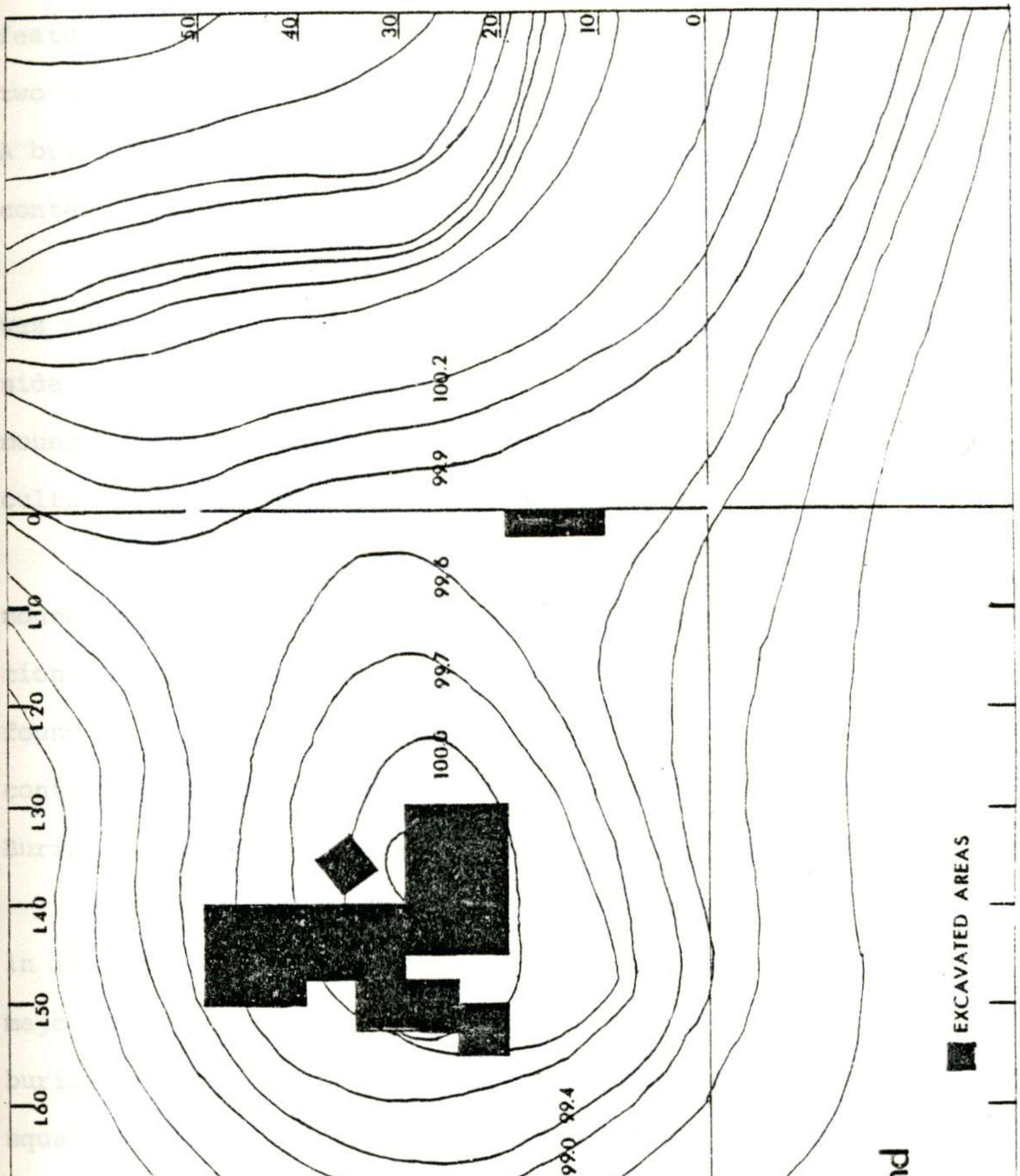

McFayden Mound
CONTOUR MAP
0 FEET 10
EXCAVATED AREAS
MN
98.6
98.9
99.0
99.4
99.6
99.7
100.0
99.9
100.2
0
10
20
30
40
50
L10
L20
L30
L40
L50
L60

Figure 2.

assigned when human bone was discovered in a feature. Some features were given two burial numbers, evidently because two or more individuals could be isolated in the feature. A brief summary of the squares excavated and their skeletal contents follows.

Square 10: Excavation of this three by ten foot square was made in order to determine the profile of the soil outside the mound area, for a clearer understanding of the mound profiles and stratigraphy. This square contained no cultural material or bone fragments (South 1962:3).

Square 20L30: The excavation of this square in the mound revealed three features, each composed of a concentration of bones representing a secondary burial. All were found at a depth of one foot below the surface. Feature 1 contained Burial 1, Feature 2 contained Burials 3 and 4, and Burials 6 and 7 were found in Feature 3 (South 1962:2).

Square 20L40: This five-foot square was excavated in irregular arbitrary levels. The square had only one major concentration of bone that could be called a secondary burial. This was located in the southwest corner of the square. The other bone from this heavily disturbed square appeared to be scattered fragments. One cremation was situated near the west side of the square, and fragments of burned bone were also scattered throughout (South 1962:2-3).

Square 25L40: Soil in this five-by-fifteen-foot square had previously been disturbed by relic hunters to a depth of about one foot. Eighteen features could be discerned in the undisturbed portions of the square. Features 2 through 10 were concentrations of human bone. Features 11 through 15 were pits containing bone scatter, but no concentrations. Features 16 and 17 contained wood charcoal, and 18 was a cremation (South 1962:3). It is not clear what Feature 1 contained. Feature 5, a large secondary burial, was the major feature of the square. It contained fragments of several skulls and numerous long bones from several individuals (South 1962:4). Some of the material excavated from this Feature had been designated as Burials 11 and 12. However, the majority of the skeletal remains had been boxed separately and had no burial designation. This material is referred to here as Burial 38 to keep it separate from Burials 11 and 12.

Square 40L40: This ten-foot square contained two undisturbed features, and a disturbed area, about .8 foot in depth, that contained scattered skeletal material. Burials 28, 29, and 30 were designated for this square (South 1962: 5-6).

Square 25L47.5: This square measured five by ten feet and was disturbed near the surface. Burned bone was present throughout the undisturbed soil, and small concentrations or pockets of burned bone within the square were assigned feature and burial numbers. Ten features were identified but only five were designated as burials. These included Features 2, 3, 4, 5, and 6 with Burials 31, 32, 33, 34, and 35 respectively (South 1962:3-4).

Square 20L50: This square was only partially excavated and contained three features of bone concentrations which were removed. Burials 2, 5, and 8 correspond with Features 1, 2, and 3 from this square (South 1962:5).

Square 35L33: This five-foot square contained one concentration of burned bone (South 1962:11). The material from this square was not present with the other skeletal samples stored at the Research Laboratories of Anthropology.

Also discovered with the skeletal remains from Bw^o67 was an adult cranium and a subadult skull. No reference in the field notes or catalog can be found concerning their location in or around the mound. Still, they are included in this analysis. The adult skull is designated as "South's burial", and the subadult as "Child burial".

Throughout the skeletal analysis, references to the skeletal remains are made using burial designations. This procedure should be less confusing than using square and feature numbers. Table 1 lists the squares and their respective feature and burial designations.

Artifacts Associated with the Mound

In his report on the exploratory excavations at the McFayden Mound, South described most of the associated artifacts. These include a stone effigy snake head, a stone pipe fragment, 18 disc shell beads, two triangular projectile points and six Cape Fear Fabric impressed sherds (South 1962:20-24). Using the pipe fragment to estimate the age of the mounds, South suggested a date of three to

TABLE 1: EXCAVATED SQUARES FROM Bw°67 WITH FEATURE AND BURIAL DESIGNATIONS

SQUARE	FEATURE NO.	BURIAL NO.
20L30	1	1
	2	3 and 4
	3	6 and 7
20L40	0-.3'	24
	.3-.5'	25
	.5-.8'	26
	.8-1.3'	27
25L40	Top Miscellaneous Bone	21
	2	36
	3	9
	4	10
	5	11, 12 and 38
	6	13 and 14
	7	15
	8	16
	9	17
	10	18
	12	19
	13	20
	18	37
40L40	o-.8'	28
	1	29
	2	30
25L47.5	2	31
	3	32
	4	33
	5	34
	6	35
20L50	1	2
	2	5
	3	8

five hundred years ago, A.D. 1400 to 1600 (South 1962:23).

Evidently during the excavation of the mound several artifacts were mistaken for skeletal remains and stored accordingly. Two pottery sherds were found placed with the cranial material from Feature 5 in the 25L40 trench. Since they were small and relatively thin, these two sherds could have easily been mistaken for cranial fragments. The sherds probably were originally in the area surrounding the mound and became mixed with burial fill. One sherd had a sandy paste with a large quantity of sand and grit temper inclusions. The surface treatment was plain. This sherd was probably of the Deep Creek series (Michael Trinkley, personal communication) which dates from 1000 B.C. to 300 B.C. (Anderson and Trinkley 1981:5).

The second sherd also had a sandy temper but the surface treatment was a fine fabric impression. These characteristics resembled Loftfield's Adam's Creek series, with a proposed temporal placement in the late Middle Woodland period, around A.D. 1000 (Anderson and Trinkley 1981:5).

The pottery sample present in the burial fill at the McFayden Mound led to some speculation concerning the age of the mound and possible contacts made with its inhabitants. The Adam's Creek sherd allowed for a date of at least A.D. 1000. However, as mentioned earlier, a pipe stem fragment had estimated dates ranging from A.D. 1400 to A.D. 1600. If the latter range was correct for the mound then it was conceivable that shell tempered pottery, Oak Island series, was not introduced into this area until after 1400, if at all. Oak Island pottery sherds were found at Nh^v28, an ossuary in New Hanover County (Coe et al. 1981:25), but none were present at Cd^o1, a late Woodland burial mound in Cumberland County (MacCord 1966:33). However, shell tempered pottery usually is not found very far from the coast (Jack Wilson personal communication).

A shell earpin (or hairpin) was found with the post-cranial material from Feature 4 of the 25L47.5 square. The chalky condition of the shell resembles poorly preserved long bone fragments and could be mistaken as such. Such earpins were made using the columella or central spine of the conch shell, which was roughed out, ground on stones and then polished (Brain 1979:252). An early eighteenth-century account of the use of earpins follows:

> The women ornament themselves with earrings made of the core of a great shell called "burgo" of which I have spoke. The ear pendant is large as the little finger and at least as long. They have a hole in the lower part of each ear large enough to insert this ornament. It has a head a little larger than the rest to prevent it from falling out (Swanton 1911:55).

Earpins are known from late pre-historic sites in the North Carolina mountains, such as the Peachtree site (Brain 1979:252), and protohistoric/historic Siouan villages on the piedmont, such as Upper Saura Town, Sk^v1 and Sk^v1a (Jack Wilson personal communication). None has been retrieved from any other sand burial mound on the coastal plain.

CHAPTER V

ANALYSIS OF THE SKELETAL REMAINS FROM THE McFAYDEN MOUND

Total Number of Individuals

At least 47 individuals were represented in the excavated skeletal remains from the McFayden Mound. As this burial mound was made up of secondary deposits of largely disarticulated bones, this total was obtained by carefully listing the frequency of each type of bone from the mound, and determining whether the bone was from the right or left side of the skeleton. All complete and identifiable fragmented bones were examined to make this count as accurate as possible.

Since few proximal or distal ends were present, long bone shaft fragments that were at least half of the entire bone, were counted as one individual bone element. Any bone fragment that represented less than half of a whole bone was recorded but not included in the inventory of individuals. Table 2 lists the inventory for adults and Table 3 for subadults.

Forty-one adults were represented by right temporals and six subadults were identified by dental remains. These are the most numerous bone types present in the sample for the two age categories, and they indicate at least 47

TABLE 2:

NUMBER OF INDIVIDUALS REPRESENTED BY EACH TYPE OF ADULT BONE IN THE Bw°67 SAMPLE

Bone Type	Right		Left
Cranial:			
Frontal		20	
Parietal	24		23
Occipital		24	
Temporal	41		32
Sphenoid		3	
Maxilla		8	
Mandible		25	
Dental Remains		20	
Postcranial:			
Long Bones:			
Humerus	21		16
Radius	9		9
Ulna	8		9
Femur	31		32
Tibia	11		15
Fibula	5		5
Irregular Bones:			
Clavicle	7		9
Scapula	8		9
Innominate	9		3
Patella	5		5
Rib		4(103)	
Vertebrae:			
Cervical			
1		0	
2		6	
3-7		4(22)	
Thoracic:			
1-12		2(27)	
Lumbar:			
1-5		2(7)	
Hand Bones:			
Carpals:			
Navicular	0		0
Lunate	1		3
Triquetral	2		0
Pisiform	0		1
Greater Multangular	0		0
Lesser Multangular	0		0
Capitate	1		1
Hamate	0		0

Bone	Right		Left
Hand Bones-Cont.			
Matacarpals:			
1	0		0
2	0		0
3	0		1
4	0		0
5	1		1
Phalanges:			
Proximal 1-5		2(17)	
Middle 1-5		1(2)	
Distal 1-5		0	
Foot Bones:			
Tarsals:			
Calcaneus	5		6
Talus	4		9
Cuboid	1		1
Navicular	3		1
Cuneiforms			
1	2		3
2	0		1
3	0		1
Metatarsals			
1	3		6
2	2		3
3	3		5
4	3		1
5	5		5
Phalanges:			
Proximal 1-5		2(16)	
Middle 1-5		1(6)	
Distal 1-5		1(2)	

TABLE 3:

NUMBER OF INDIVIDUALS REPRESENTED BY EACH TYPE OF SUBADULT BONE IN THE Bw^{o}67 SAMPLE

Bone Type	Right		Left
Cranial:			
Frontal		2	
Parietal	1		1
Occipital		1	
Temporal	5		4
Sphenoid		1	
Maxilla		1	
Mandible		3	
Dental Remains		6	
Postcranial			
Long Bones:			
Humerus	2		3
Radius	1		2
Ulna	0		1
Femur	1		0
Tibia	2		1
Fibula	2		1
Irregular Bones:			
Scapula	1		1
Patella	1		0
Foot Bones:			
Tarsal:			
Cancaneous	1		
Talus	2		

individuals. In general, the adult category includes those individuals who were older than 18 years at the time of death, whereas those individuals not yet 15 years were considered subadults. When age could not be determined by epipheseal closure, the size of the bone and morphological maturity were observed to indicate age at death. See pages 87 through 110 for a fuller discussion of procedures for aging the remains. Many smaller bones of the human skeleton attain morphological maturity earlier than age 18 (Ubelaker 1974:32) and may have been included in the adult category of the McFayden Mound inventory.

Variability in Bone Representation

The "bone-by-bone" inventory of the skeletal remains retrieved from the McFayden Mound not only reveals the minimum number of adults and subadults present, but also shows the variability in the quantity of each bone type. In the adult listing, 41 individuals were represented by right temporal bones, while only three individuals were indicated by the entire number of handbones. In many cases only one adult individual was represented by specific hand and feet bones. Although the presence of six subadults was indicated by dental remains, no hand bones, and very few irregular and foot bones were recorded. Tables 4 and 5 clearly document the variance in adult and subadult bone representation. These tables rank the bones in the order of the number they represent. Thus, according to Table 4, 41 adults were represented by right temporals, 32 by left femurs, etc.

TABLE 4:

ORDER OF REPRESENTATION OF ADULTS IN THE Bw°67 SAMPLE AS INDICATED BY BONE TYPES

Bone	Represented No.	Represented %	Absent No.	Absent %
Temporal	41	100	0	0
Femur	32	78	9	22
Mandible	25	61	16	39
Parietal	24	58	17	42
Occipital	24	58	17	42
Humerus	21	51	20	49
Frontal	20	49	21	51
Dental Remains	20	49	21	51
Tibia	16	39	25	61
Radius	9	22	32	78
Ulna	9	22	32	78
Clavicle	9	22	32	78
Scapula	9	22	32	78
Innominate	9	22	32	78
Talus	9	22	32	78
Maxilla	8	20	33	80
Cervical 2nd Vertebrae	6	15	35	85
Calcaneus	6	15	35	85
Metatarsals (1st)	6	15	35	85
Fibula	5	12	36	88
Patella	5	12	36	88
Metatarsals (3rd)	5	12	36	88
Metatarsals (5th)	5	12	36	88
Ribs	4	10	37	90
Cervical (3-7)	4	10	37	90
Sphenoid	3	7	38	93
Lunate	3	7	38	93
Navicular	3	7	38	93
Cuneiform (1st)	3	7	38	93
Metatarsals (2nd)	3	7	38	93
Metatarsals (4th)	3	7	38	93
Thoracic Vertebrae	2	5	39	95
Lumbar Vertebrae	2	5	39	95
Triquetral	2	5	39	95
Phalanges (Prox. Hand)	2	5	39	95
Phalanges (Prox. Foot)	2	5	39	95
Capitate	1	2	40	98
Metacarpals (3rd)	1	2	40	98
Metacarpals (5th)	1	2	40	98
Phalanges (Mid. Hand)	1	2	40	98
Cuneiform (2nd)	1	2	40	98
Cuneiform (3rd)	1	2	40	98
Phalanges (Mid. Foot)	1	2	40	98
Phalanges (Dis. Foot)	1	2	40	98

TABLE 5:

ORDER OF REPRESENTATION OF SUB-ADULTS IN THE
Bw°67 SAMPLE AS INDICATED BY BONE TYPES

Bone	Represented No.	Represented %	Absent No.	Absent %
Dental Remains	6	100	0	0
Temporal	5	83	1	17
Mandible	3	50	3	50
Humerus	3	50	3	50
Frontal	2	33	4	67
Radius	2	33	4	67
Tibia	2	33	4	67
Fibula	2	33	4	67
Talus	2	33	4	67
Parietal	1	17	5	83
Occipital	1	17	5	83
Sphenoid	1	17	5	83
Maxilla	1	17	5	83
Ulna	1	17	5	83
Femur	1	17	5	83
Scapula	1	17	5	83
Patella	1	17	5	83
Calcaneus	1	17	5	83

Also illustrated are the percentages and unrepresented individuals by each bone. Tibias from 16 adults were recovered, which represents 39 per cent of the total number of adults, while 25 tibias or 61 per cent were missing. This differential representation probably can be attributed to sample bias, as the mound was only partially excavated. It is not unreasonable to suggest that missing bones were placed elsewhere in the mound. Other factors contributed to the variability of bone type presence. Probably the most destructive was the heavy disturbance of the mound by relic hunters as evidenced by numerous potholes, and bone scatter on the mound surface. In reference to this, South states that "there is hardly a spot on the slight rise of the mound that has not a hole dug into it" (South 1962:4).

In addition to the post-deposition disturbance, bone could have been lost prior to interment through animal disturbance or by human error while transporting the skeletal remains to the mound for final interment. Selection by the aborigines of particular bones, such as the skull, for disposal may also have biased the sample. Further loss by erosion and decomposition could account for the noticable absence of smaller adult bones and infant remains. Finally, potential loss and destruction of skeletal remains during and after the excavation process should be recognized (Ubelaker 1974:33). Most of the skeletal material recovered from the McFayden Mound had not been cleaned and washed prior to its 18 years of storage. The sand and salt still adhering to the bone caused much splintering and warping, especially of many long bones. This restricted the number of bones that could be reconstructed, and included in the inventory. The majority of bone loss, however, probably occurred through natural and human agents before the mound was excavated in 1962.

Interestingly, more foot bones were present in the sample than hand bones. Eleven individuals, or 23 percent of the minimum number of individuals, were represented by tali (foot bone) while only three were indicated by lunates (hand bone). This variability probably reflects the greater tendency for foot ligaments to resist decomposition, allowing the foot bones to remain articulated during interment (Ubelaker 1974:35).

Another interesting observation was that, after teeth, the temporal bone was the second most common bone in the subadult category and the most prevalent in the adult category. Since the temporal bone is part of the skull, it is possible that the skull, more often than any other bone, was placed in the mound to represent an individual. Furthermore, since the temporal bone is especially resistant to decomposition (Ubelaker 1974:35), it is not surprising that it appears frequently.

Bone Deposition and Patterning

It has been suggested that placement of skeletal remains into secondary burial complexes, such as sand mounds and ossuaries, was a random process with little order or structure (MacCord 1966:35 and Ubelaker 1974:37). The burial remains from the McFayden mound were examined to determine whether or not a pattern in bone placement was present. Using the excavated squares as units of space, this study concentrated on three areas of analysis. The first area concerned the placement of individuals in the excavated area. Adults were located using right temporals (41 individuals and the subadults by right temporals (5 individuals) and mandibular dentition (6 individuals). The second study concentrated on the distribution of burned or cremated bone by weight and by fragments identified as either belonging to cranial or postcranial bones. The location of all the skeletal remains by total weight in the excavated square was the third area of analysis.

Individuals

A complete inventory of the burial remains from the McFayden mound was made to determine the minimum number of individuals present in the sample. The percentage of bone types present in each feature and square for adults and subadults are listed in Tables 6 and 7. Note that two craniums, "South's burial" and the child burial, are included in the percentage calculations, although their location in or around the mound is unknown.

The adult individuals are represented by 41 right temporals. Twenty-four percent of the adults are located in Feature 5 in the 25L40 trench. This was the largest feature in the excavated area of the mound. The trench

TABLE 6: PERCENTAGES OF ADULT BONE IN FEATURES AND SQUARES

Square			20L30				20L40		25L40																
Feature			1	2	3	Total	0-1.3'	Total	Sur-face	1	2	3	4	5	6	7	8	9	10	11	12	13	14-17	18	Total
Frontal		20=100%	-	5	10	15%	10	10%	-	-	-	5	-	25	10	-	-	-	-	-	-	-	-	-	40%
Parietal	RT	24=100%	8	8	8	25%	13	13%	4	-	-	-	-	17	8	4	-	4	-	-	-	-	-	-	37%
	LT	23=100%	8	9	9	27%	13	13%	-	-	-	4	-	21	4	-	-	-	-	-	-	-	-	-	30%
Occipital		24=100%	4	13	8	25%	4	4%	-	-	-	4	-	20	8	4	-	-	-	-	-	-	-	-	37%
Temporal	RT	41=100%	5	5	7	15%	10	10%	2	-	-	-	2	24	7	-	-	2	5	-	-	-	-	-	44%
	LT	32=100%	3	6	9	19%	25	25%	-	-	-	3	-	19	9	-	-	-	3	-	-	-	-	-	34%
Maxilla		8=100%	-	13	-	13%	13	13%	-	-	-	-	-	50	-	-	-	-	-	-	-	-	-	-	50%
Mandible		25=100%	8	8	4	20%	20	20%	4	-	-	-	-	20	-	-	-	-	-	-	-	4	-	-	28%
Humerus	RT	25=100%	5	14	-	19%	9	9%	9	-	5	-	-	38	5	-	5	-	-	-	-	-	-	-	62%
	LT	16=100%	6	19	-	25%	13	13%	6	-	-	-	-	56	-	-	-	-	-	-	-	-	-	-	62%
Radius	RT	9=100%	-	11	-	11%	44	44%	-	-	-	-	-	33	-	-	-	-	-	-	-	-	-	-	33%
	LT	9=100%	-	11	-	11	22	22%	11	-	-	-	-	44	-	-	-	-	-	-	-	-	-	-	33%
Ulna	RT	8=100%	-	-	13	13%	25	25%	-	-	12	-	-	50	-	-	-	-	-	-	-	-	-	-	62%
	LT	9=100%	-	11	-	11%	11	11%	11	-	-	-	-	44	-	-	-	-	-	-	11	-	-	-	66%
Femur	RT	31=100%	-	10	3	13%	6.5	6.5%	-	-	3	-	-	49	-	-	-	-	-	-	-	-	-	-	58%
	LT	32=100%	-	9	-	9%	13	13%	-	-	-	9	-	41	3	-	3	-	-	-	-	-	-	-	56%
Tibia	RT	11=100%	-	-	-	-%	18	18%	-	-	9	-	-	55	-	-	-	-	-	-	-	-	-	-	64%
	LT	15=100%	-	13	7	20%	20	19%	-	-	-	-	-	33	-	-	-	-	-	-	-	-	-	-	33%
Fibula	RT	5=100%	20	20	20	60%	20	20%	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	20%
	LT	5=100%	-	20	-	20%	20	20%	-	-	-	-	-	60	-	-	-	-	-	-	-	-	-	-	60%
Clavical	RT	7=100%	-	28	-	28%	-	-%	-	-	14	-	-	58	-	-	-	-	-	-	-	-	-	-	72%
	LT	9=100%	11	-	11	22%	22	22%	-	-	-	-	-	33	-	-	-	-	-	-	-	-	-	-	33%
Scapula	RT	8=100%	13	-	-	13%	13	13%	-	-	-	-	-	37	-	-	-	-	13	-	-	-	-	-	50%
	LT	9=100%	22	-	-	22%	33	33%	-	-	-	-	-	22	-	-	-	-	11	-	-	-	-	-	33%
Innomin-	RT	9=100%	33	-	-	33%	-	-	-	-	-	-	11	55	-	-	-	-	-	-	-	-	-	-	66%
ate	LT	3=100%	33	-	-	33%	-	-%	-	-	-	-	-	33	-	-	-	-	-	-	-	-	-	-	33%
Patella	RT	5=100%	-	20	-	20%	60	60%	-	-	-	-	-	20	-	-	-	-	-	-	-	-	-	-	20%
	LT	5=100%	-	20	-	20%	40	40%	-	-	-	-	-	-	-	-	-	-	20	-	-	-	-	-	20%
Rib		103=100%	1	17	8	26%	13	13%	5	-	-	-	1	41	1	-	-	1	1	-	-	-	-	-	50%
Cervical		28=100%	-	7	-	7%	11	11%	7	-	-	-	-	68	-	-	-	4	-	-	-	-	-	-	79%
Thoracic		27=100%	-	26	-	26%	4	4%	-	-	-	-	-	70	-	-	-	-	-	-	-	-	-	-	70%
Lumbar		7=100%	-	-	-	-%	-	-%	-	-	-	-	-	100	-	-	-	-	-	-	-	-	-	-	100%
Carpals		9=100%	-	33	11	44%	33	33%	-	-	-	-	-	22	-	-	-	-	-	-	-	-	-	-	22%
Metacarpals		16=100%	-	-	6	6%	25	25%	-	-	-	-	-	63	-	-	-	-	-	-	6	-	-	-	69%
Phalanges		24=100%	-	13	-	13%	25	25%	-	-	-	-	-	42	-	-	-	4	-	-	-	-	-	-	46%
Tarsals		44=100%	-	9	-	9%	25	25%	25	-	2	-	4	34	-	-	-	-	-	-	-	-	-	-	65%
Metatarsals		77=100%	-	8	-	8%	38	38%	19	-	-	-	5	27	-	-	-	-	3	-	-	-	-	-	54%
Phalanges		26=100%	-	23	-	23%	8	8%	34	-	-	-	-	31	-	-	-	-	-	-	-	-	-	-	65%

TABLE 6 (CONT'D)

Feature			40L40				25L47.5								20L50					South's Burial
Feature			0-8	1	2	Total	1	2	3	4	5	6	7-10	Total	1	2	3	.7-.9	Total	Total
Frontal		20=100%	-	10	-	10%	-	5	-	-	-	5	-	10%	-	5	5	-	10%	5%
Parietal	RT	24=100%	-	4	-	4%	-	-	-	-	-	-	-	-%	8	-	8	-	17%	4%
	LT	23=100%	-	-	-	-%	-	-	-	-	-	-	-	-%	13	4	8	-	26%	4%
Occipital		24=100%	-	8	-	8%	-	-	-	-	-	4	-	4%	12	4	-	-	17%	4%
Temporal	RT	41=100%	-	10	2	12%	-	5	2	-	-	-	-	7%	2	2	5	-	10%	2%
	LT	32=100%	-	9	3	13%	-	3	-	-	-	-	-	3%	-	3	-	-	3%	3%
Maxilla		8=100%	-	12	-	12%	-	-	-	-	-	-	-	-%	-	-	-	-	-%	12%
Mandible		25=100%	-	12	-	12%	-	4	-	-	-	-	-	4%	8	-	8	-	16%	-
Humerus	RT	25=100%	-	5	5	10%	-	-	-	-	-	-	-	-%	-	-	-	-	-%	-
	LT	16=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Radius	RT	9=100%	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	11%	-
	LT	9=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	-	12%	-
Ulna	RT	8=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	LT	9=100%	-	-	-	-	-	-	-	-	-	-	-	-	11	-	-	-	11%	-
Femur	RT	31=100%	-	-	-	-	-	3	-	-	-	3	-	6.5%	6.5	6.5	3	-	16%	-
	LT	32=100%	-	3	-	3%	-	-	-	-	-	6	-	6%	6	6	-	-	13%	-
Tibia	RT	11=100%	-	-	9	9%	-	8	-	-	-	-	-	9%	-	-	-	-	-	-
	LT	15=100%	-	13	7	20%	-	-	-	-	-	-	-	-	-	7	-	-	7%	-
Fibula	RT	5=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	LT	5=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Clavical	RT	7=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	LT	9=100%	-	11	-	11%	-	11	-	-	-	-	-	11%	-	-	-	-	-	-
Scapula	RT	8=100%	-	12	-	12%	-	-	-	-	-	-	-	-	-	12	-	-	12%	-
	LT	9=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	11%	-
Innomin-	RT	9=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ate	LT	3=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Patella	RT	5=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	LT	5=100%	-	-	-	-	-	-	-	-	-	20	-	20%	-	-	-	-	-	-
Rib		103=100%	-	-	-	6%	-	1	-	-	-	-	-	1%	3	-	1	-	4%	-
Cervical		28=100%	-	-	-	-	-	4	-	-	-	-	-	4%	-	-	-	-	-	-
Thoracic		27=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lumbar		7=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carpals		9=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metacarpals		16=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phalanges		24=100%	-	4	-	4%	-	8	-	-	-	4	-	12%	-	-	-	-	-	-
Tarsals		44=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metatarsals		77=100%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phalanges		26=100%	-	4	-	4%	-	-	-	-	-	-	-	-	-	-	-	-	-	-

TABLE 7:

PERCENTAGES OF SUBADULT BONE IN FEATURES AND SQUARES

Bone Type		No.=100%	Square Feature 20L30 1 %	2 %	3 %	T% Sq.	20L40 1-1.3/T% %	Sq.	10	25L40 Sur. %	4 %	5 %	6 %	8 %	T% Sq.	Child Burial %	T%	25L47.5 2 %	T %
Frontal		2	-	-	-	-	50	50%		-	-	-	-	-	-	50	50%	-	-
Parietal	Rt	1	-	-	-	-	--	-		-	-	-	-	-	-	100	100%	-	-
	Lt	1	-	-	-	-	-	-		-	-	-	-	-	-	100	100%	-	-
Occipital		1	-	-	-	-	-	-		-	-	-	-	-	-	100	100%	-	-
Temporal	Rt	5	-	-	-	-	40	40%		-	-	-	20	20	40%	20	20%	-	-
	Lt	4	-	-	-	-	50	50%		-	-	-	25	-	25%	25	25%	-	-
Maxilla		1	-	-	-	-	-	-		-	-	-	-	-	-	100	100%	-	-
Mandible		3	-	-	-	-	-	-		33	-	33	-	-	66%	34	34%	-	-
Dental Remains		6					16	16%	17	17		16			50%	17	17%	17	17%
Humerus	Rt	2	-	-	-	-	-	-		-	-	100	-	-	100%	-	-	-	-
	Lt	3	-	-	-	-	-	-		-	34	66	-	-	100%	-	-	-	-
Radius	Rt	1	-	-	-	-	-	-		-	-	100	-	-	100%	-	-	-	-
	Lt	2	-	50	-	50%	-	-		-	-	50	-	-	50%	-	-	-	-
Ulna	Lt	1	100	-	-	100%	-	-		-	-	-	-	-	-	-	-	-	-
Femur	Rt	1	-	-	-	-	-	-		-	-	100	-	-	100%	-	-	-	-
Tibia	Rt	2	-	50	-	50%	-	-		-	-	50	-	-	50%	-	-	-	-
	Lt	1	-	100	-	100%	-	-		-	-	-	-	-	-	-	-	-	-
Fibula	Rt	2	-	50	-	50%	-	-		-	-	50	-	-	50%	-	-	-	-
	Lt	1	-	100	-	100%	-	-		-	-	-	-	-	-	-	-	-	-
Scapula	Rt	1	-	-	-	-	-	-		-	-	100	-	-	100%	-	-	-	-
	Lt	1	-	-	-	-	-	-		-	-	100	-	-	100%	-	-	-	-
Patella	Rt	1	-	-	-	-	-	-		-	-	100	-	-	100%	-	-	-	-
Tarsal		2	-	-	-	-	-	-		-	-	100	-	-	100%	-	-	-	-

itself contained 44 per cent of the total number of adult individuals. It is not unexpected that this area of the mound would contain the majority of the burials, as it was near the center of the mound where the height was greatest. Also, the 25L40 trench was the largest unit, at 108 square feet. Figure 3 illustrates the location, number, and percentage of adults and subadults in the excavated portion of the mound. From the center of the Mound (or the 25L40 trench), the number of adult individuals decreases about evenly in all directions.

The location of subadults is determined by dental remains and right temporals. The same pattern of distribution exists with the subadults as the adults. The majority (50 and 40 per cent for dental remains and temporals respectively) of the subadult individuals are concentrated in the central area of the mound. Away from the center, there is a sudden decrease in subadults, with virtually none represented in the peripheral units.

Cremated Remains

The burned remains from the mound were divided into two categories, those fragments that could be identified as cranial or postcranial and those that could not. The former were counted and the latter weighed. Identified bones represent about a fourth of all the burned remains. Table 8 lists the burned remains, their location, and percentage in the features and squares.

Unidentified bones (Figure 4) were most numerous in

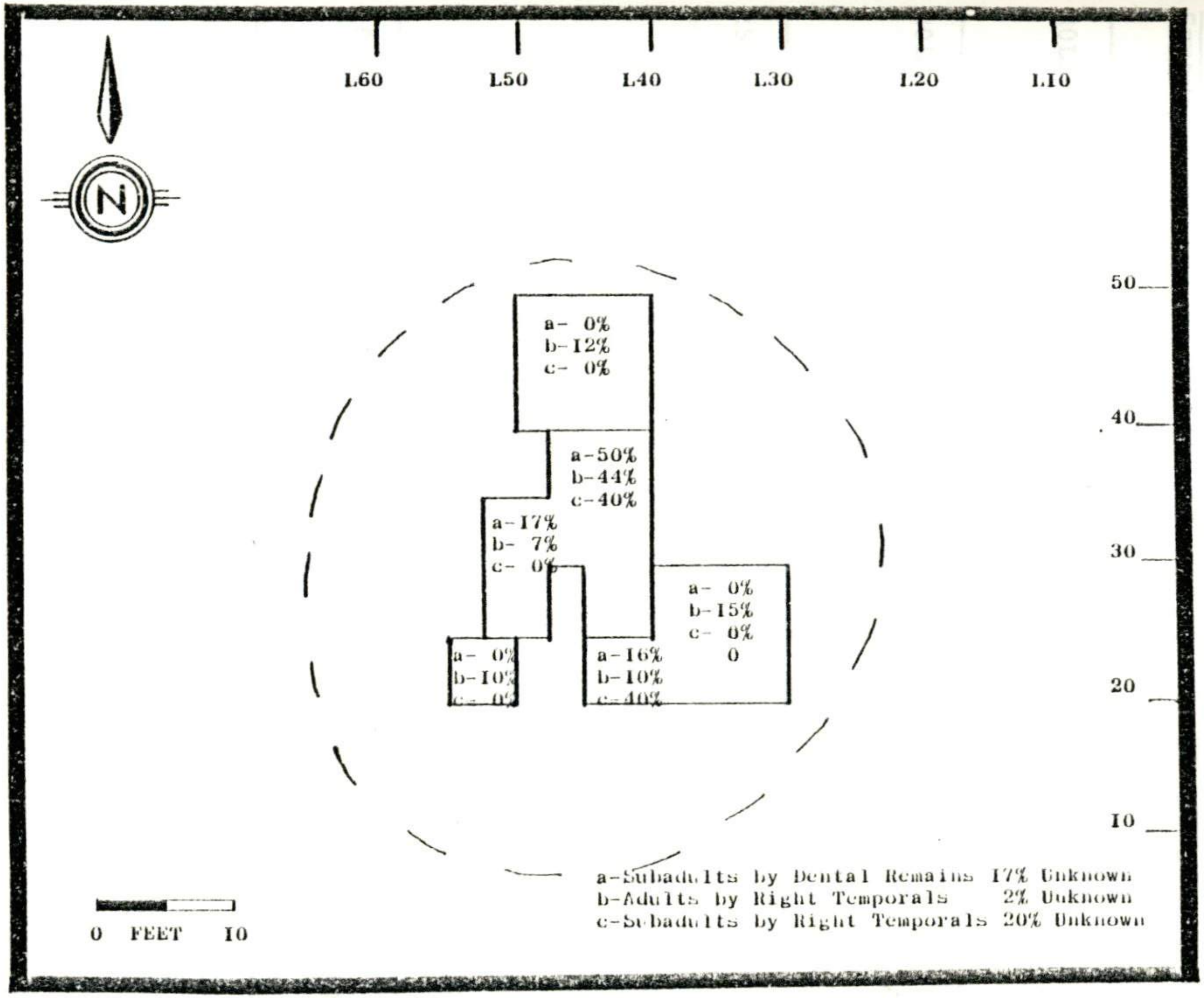


Figure 3.--Location of individuals by percentages in the excavated units.

TABLE 8:

LOCATION AND PERCENTAGES OF IDENTIFIED AND UNIDENTIFIED BURNED BONES FROM Bw°67

Square	Feature	Identified			Unidentified		
		No.	% Fea.	% Square	Weight	% Fea.	% Square
20L30	1	17	3.0				
	2	7	1.0	6.7%			0%
	3	10	2.0				
20L40	0-.3	2	.3				
	.3-.5	56	9.0	32%			16.5%
	.5-.8	8	1.0				
	.8-1.3	124	21.0		6oz.	16.5	
25L40	Top Misc.	21	4.0				
	3	3	.5				
	4	4	.7				
	5	66	11.0		8oz.	22.0	
	6	4	.7				30%
	8	8	1.0	29%			
	9	4	.7				
	10	33	6.0				
	12	2	.3				
	13	1	.2				
	18	23	4.0		3oz.	8.0	
40L40	0-.8	4	.7				
	1	8	1.0	2%			0%
	2	1	.2				
25L47.5	2	10	2.0				
	3	69	12.0	27%	8oz.	22.0	
	4	53	9.0		4.5oz.	12.0	53.5%
	5	25	4.0		7oz.	10.0	
	6	2	.3				
20L50	1	1	.2				
	2	4	.7	4%			0%
	.7-.9'	17	3.0				
TOTAL		584		100%	36.5oz.		100%

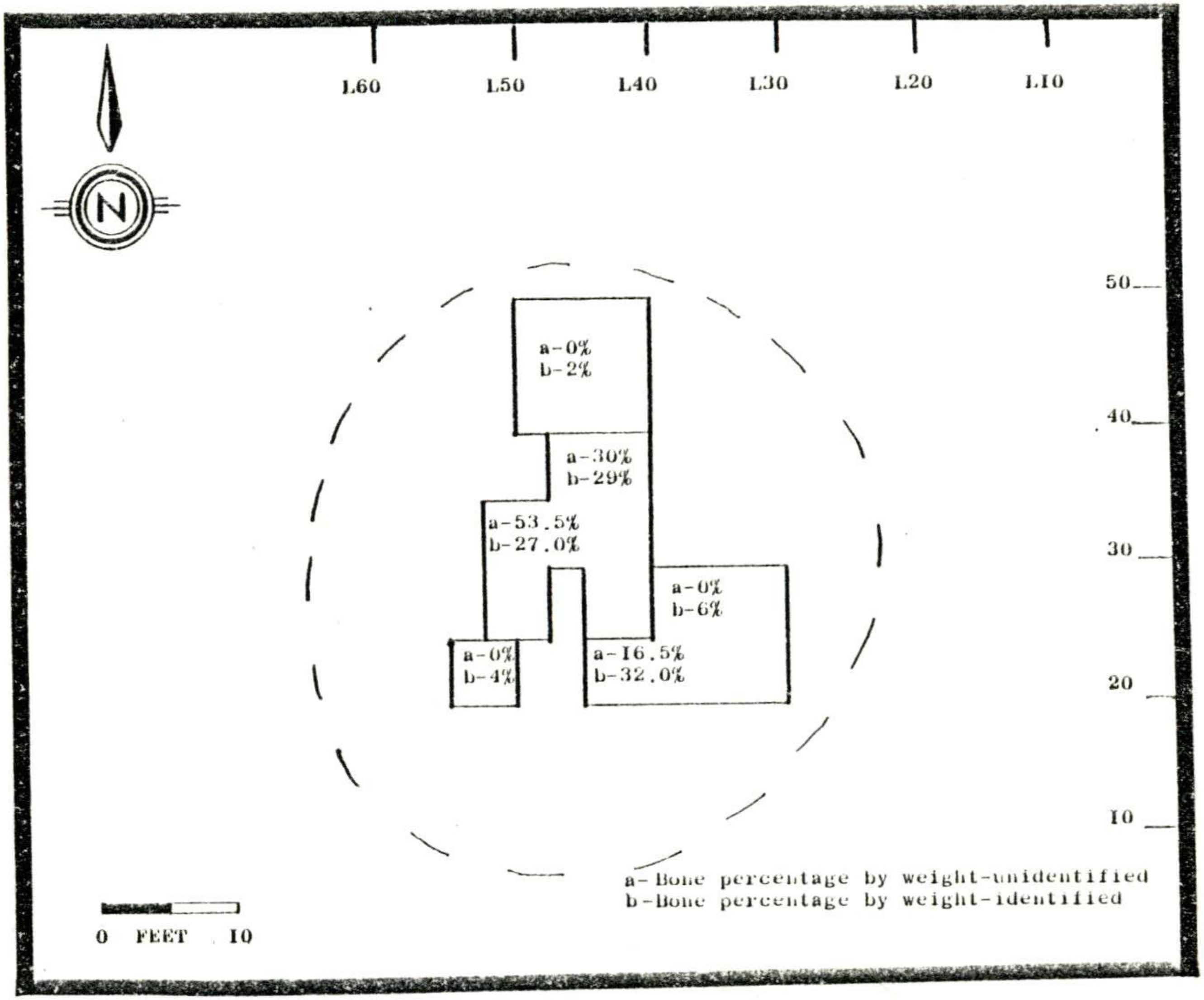


Figure 4.--Location of burned bone in the excavated units.

the 25L47.5 trench, west of the mound's center. Thirty per cent of the burned remains was found in the 25L40 trench and 16.5 per cent in the 20L40 square. Bone deposits decrease significantly as one moves away from these three units toward the periphery.

Amounts of identified burned bone was about equal in the 25L47.5, 25L40, and 20L40 units, with lower percentages being present in the other three excavation units.

All Remains

The amounts of all cranial and post cranial material in each feature and unit calculated from weight, is given in Table 9. Figures 5, 6, and 7 illustrate the pattern of deposition in the excavated area of the mound, as indicated by weight. As expected, the 25L40 unit contained the bulk of the total bone (53.9 per cent), followed by the 20L30 square (12.3 per cent) and 20L40 square (12 per cent). Although only 25 square feet in size and partially excavated, the 20L50 square contained the next largest amount of skeletal remains (9.2 per cent). The percentage of bone represented by weight dropped significantly in the 25L47.5 square (4.4 per cent) and the 40L40 square (5.9 per cent).

Summary

This study has shown that the majority of adult and subadult individuals and bone mass had been deposited in the center of the mound. The location of temporal fragments of adults suggests that skull placements occurred in the central

TABLE 9: LOCATION OF IDENTIFIED CRANIAL AND POSTCRANIAL BONE BY WEIGHT

Square	Feature	Weight In Oz. Cranial	%	Weight In Oz. P.Cranial	%	Combined Weight	%
20L30	1	8.5	2.5	11.5	1.3	20.0	1.7
	2	27.5	8.1	59.0	6.8	86.5	7.2
	3	20.5	6.1	20.0	2.3	40.5	3.4
TOTAL		56.6	16.8	90.5	10.5	147.0	12.3%
		(3.5 lbs.)		(5.6 lbs.)		(9.1 lbs)	
20L40	0-1.3'	38.0	11.3	105.5	12.2	143.5	12
TOTAL		38.0	11.3	105.5		143.5	
		(2.3 lbs)		6.6 lbs)		(8.9 lbs)	
25L40	Surface	7.5	2.2	34.0	4.0	41.5	3.5
	2	0	0	11.0	1.3	11.0	.92
	3	12.0	3.6	18.5	2.15	30.5	2.5
	4	3.5	1.0	8.0	.95	11.5	.9
	5	69.5	20.7	406.5	47.2	476.0	39.8
	6	18.5	5.5	8.5	1.0	27.0	2.3
	7	3.0	.9	0	0	3.0	.3
	8	16.0	4.8	4.5	.5	20.5	1.7
	9	2.0	.7	2.0	.2	4.0	.35
	10	5.5	1.6	6.0	.7	11.5	.9
	12	1.0	.3	3.0	.3	4.0	.35
	13	1.0	.3	0	0	1.0	.08
	18	0	0	3.0	.3	3.0	.3
TOTAL		139.5	41.6	505.0	58.6	644.5	53.9
		(8.7 lbs)		(31.5 lbs)		(40.2 lbs)	
40L40	.0-.8	2.5	.7	4.0	.5	6.5	.5
	1	24.5	.4	32.0	3.7	56.5	4.7
	2	2.5	.7	5.0	.6	7.5	.6
TOTAL		29.5	8.8	41.0	4.8	70.5	5.9
		(1.8 lbs)		(2.6 lbs)		(4.4 lbs)	
25L47.5	2	9.0	2.7	12.0	1.4	21.0	1.7
	3	0	0	8.0	.95	8.0	.7
	4	0	0	5.0	.6	5.0	.4
	5	0	0	8.0	.95	8.0	.7
	6	0	0	11.0	1.3	11.0	.9
TOTAL		9.0	2.7	44.0	5.2	53.0	4.4
		(.56 lbs)		(2.75 lbs)		(3.31 lbs)	
20L50	1	16.0	4.8	19.0	2.2	35.0	3.0
	2	10.0	3.0	30.5	3.5	40.5	3.3
	3	7.5	2.2	20.0	2.3	27.5	2.3
	7-.9	1.0	.3	6.0	.7	7.0	.6
TOTAL		34.5	10.3	75.5	8.7	110.0	9.2
		(2.2 lbs)		(4.7 lbs)		(6.9 lbs)	
Child Burial	?	7.5	2.2	0	0	7.5	.6
		(.46 lbs)			0	(.46 lbs)	
South's Burial	?	21.0	6.3	0		21.0	1.7
		(1.3 lbs)				(1.3 lbs)	
TOTALS		335.5	100.0	861.5	100.0	1197.0	100.0
		(20.9 lbs)		(53.81 lbs)		(74.8 lbs)	

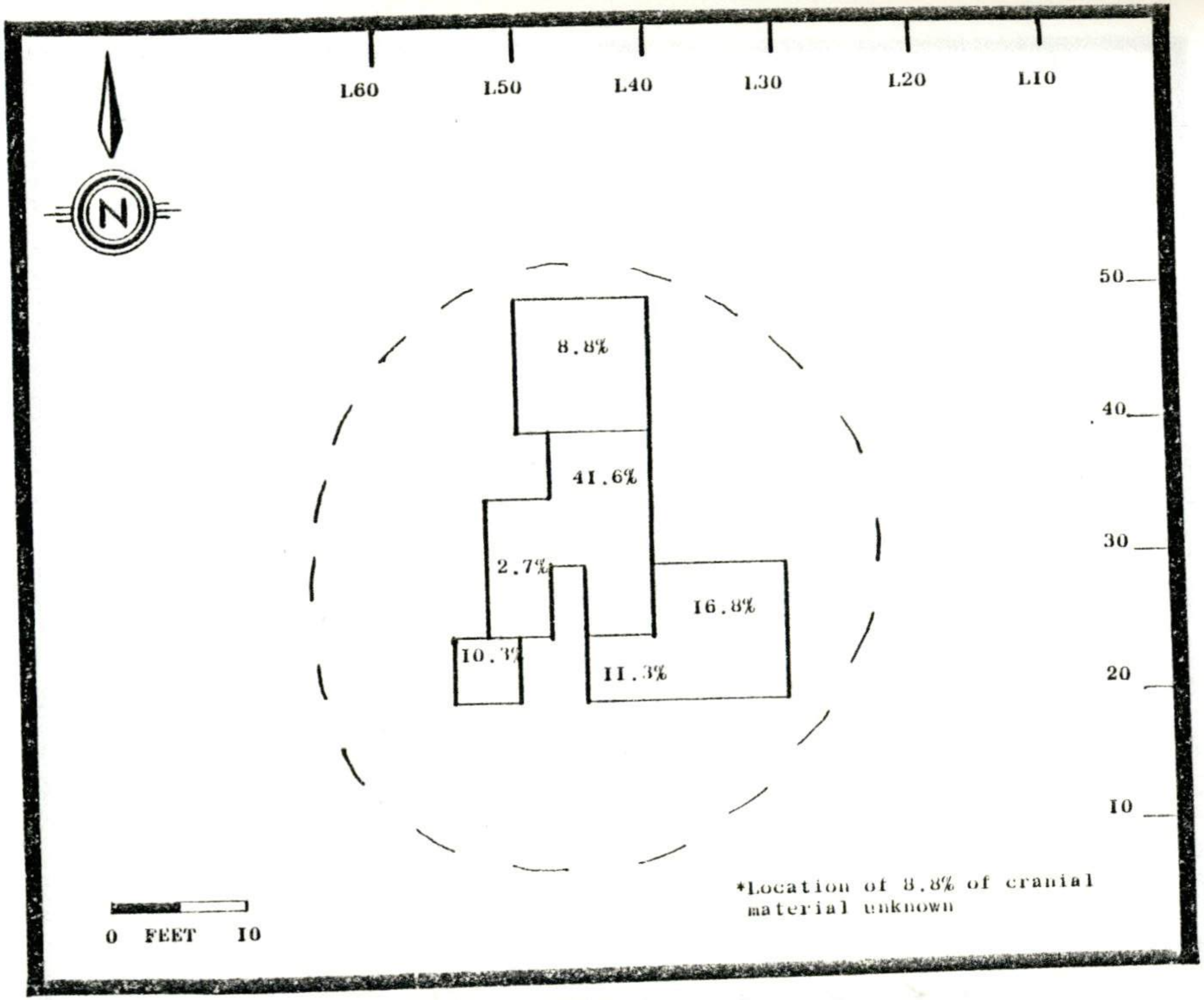


Figure 5.--Location of cranial remains in excavated units by weight.*

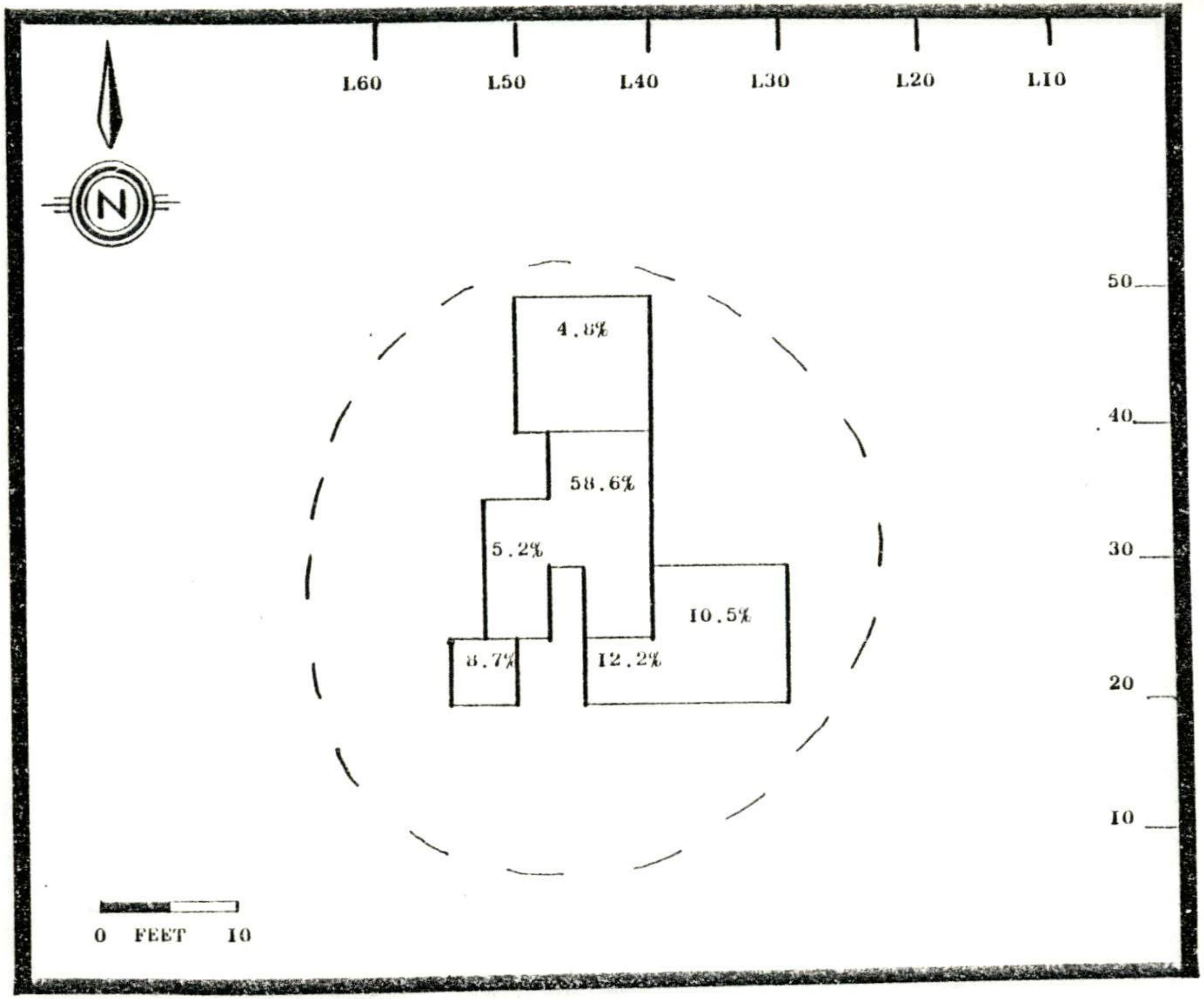


Figure 6.--Location of post-cranial remains in excavated units by weight.

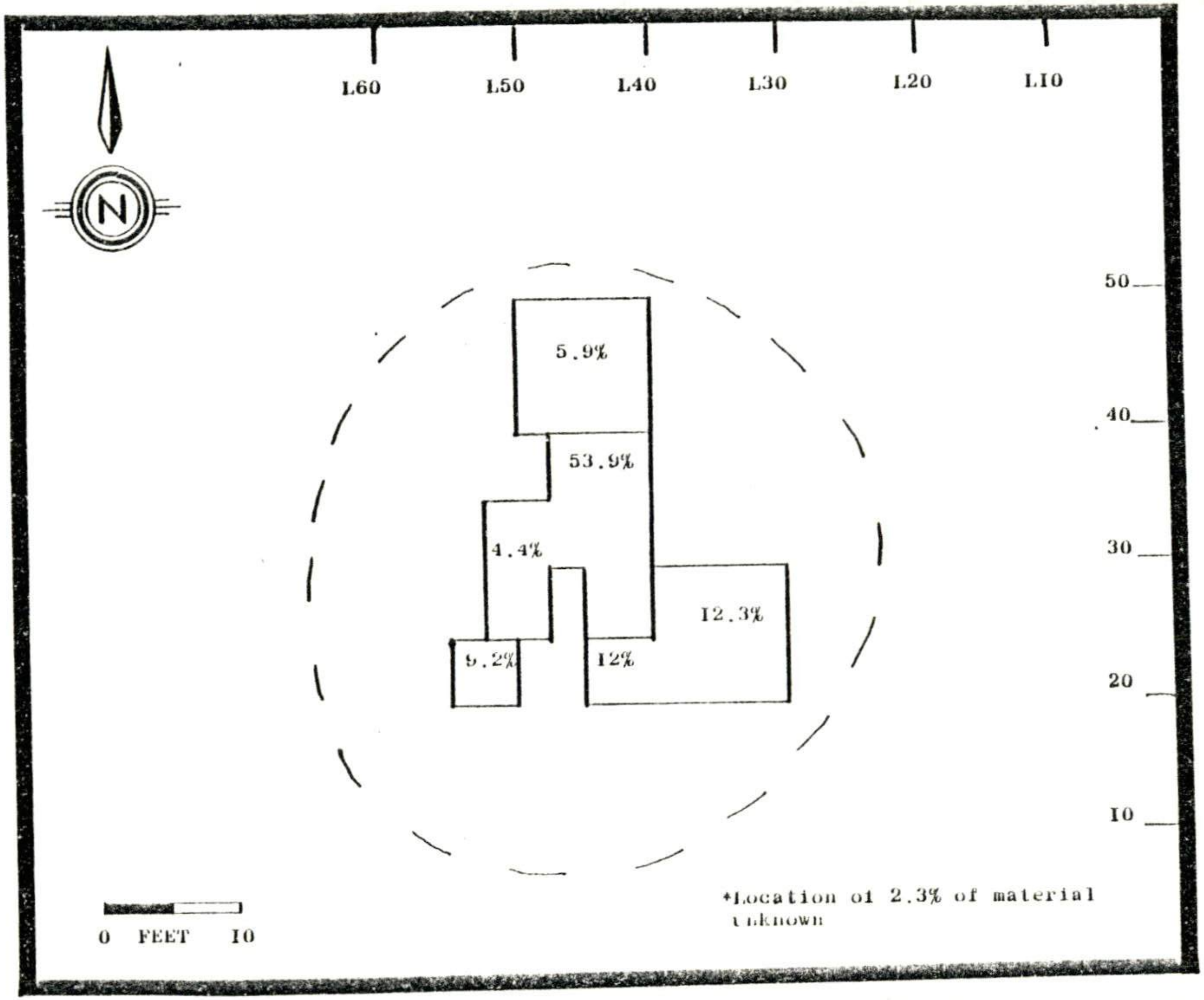


Figure 7.--Location of skeletal remains in excavated units by weight.*

mound area and toward the north and east. The placement of subadults, indicated by temporal and dental remains, suggested that deposition occurred from the center out, primarily to the west and south.

Cremated or burned remains were also heavily concentrated in areas south and west of the mound center, with the largest percentage in the 25L47.5 trench.

A pattern does appear with a concentration of burials in the area of the L47 line and a focus of burned bone to the west of this area. Also, the placement of skulls, both adult and subadult, seems to have been in the central portion of the mound for both adults and subadults.

Thus, it appears that the center of the mound was available for the deposition of all three classes represented by skeletal remains - adults, subadults and cremations. The adult remains predominated throughout the rest of the sections of the mound. Visual inspection of the distribution of the remains as shown in Figures 3 and 4 seemed to indicate that the west and south portions of the mound contained more of subadult and cremated remains than the other areas of the mound. Attempts to apply the Chi square statistic as listed by Remington and Schork (1970:238) were not met, in that some of the expected frequencies were less than one, and over twenty per cent of the expected frequencies were less than five. The analysis was performed using the distribution of adult and subadult individuals noted by right temporals. No combination of classes could be made to change the observed frequencies. Therefore, since the sample size was too small and the excavation units non-standard, the data was not amenable to statistical manipulation.

Sexing Cranial Remains: Morphological Analysis

A number of factors influence the accuracy of sexing skeletal remains, but two are very important when treating secondary burials. First, fragmented and disarticulated remains limit the analysis of entire skeletons, therefore lowering the probability of accurately sexing an individual. For example, whereas an entire skeleton can be sexed correctly every time, an adult skull alone can be sexed correctly only 90 per cent of the time (Krogman 1978:149). The age of the individual also must be taken into account, as definitive sexual traits of the skull are not evident until puberty (15 to 18 years old)(Krogman 1978:112-113). Thus, sexing of cranial remains of the sample from the McFayden Mound is limited to mature individuals where morphological traits can be observed. In order to determine the sex ratio present in this sample, seven calvas, three calvariums, one cranium, and five frontal bones were examined for morphological sex traits listed by Krogman (1978:114-117). Table 10 gives the results of this sexing method for the study sample.

Observations of Morphological Traits of the Cranium

The one cranium found in the skeletal remains, "South's Burial", exhibited traits characteristic of females. The

TABLE 10: ESTIMATED SEX OF CRANIAL REMAINS FROM Bw^{o}67

Burial	Square	Feature		Sex
South's Burial			Cranium	Female
1	20L30	1	Calva	Unknown
2a	20L50	1	Calva	Female
4	20L30	2	Calva	Female
5	20L50	2	Calvarium	Female
6	20L30	3	Calva	Male
8	20L50	3	Calva	Male
9	25L40	5	Frontal Bone	Unknown
11	30L40	5	Calvarium	Female
12	30L40	5	Calva	Female
13	30L40	5	Calvarium	Female
24	20L40	.0-.3'	Calva	Female
27	20L40	8	Frontal Bone	Female
29	40L40	1	Frontal Bone	Male
30	40L40	2	Frontal Bone	Male
31	25L47.5	2	Frontal Bone	Male
38a	25L40	5	Calva	Male

general appearance of the skull was smooth and gracile. The supra-orbital ridges were small to medium, both the frontal and the parietal eminences were large, and the forehead was rounded and full. A small amount of muscle marking, a trait usually found in males, was observed on the occipital bone. Overall, however, this cranium had the appearance of a female individual.

Observations of Morphological Traits of Calvas

The observation of few morphological traits was possible when the calva alone was present. Most of the following statements concerning the sex of individuals are based on the size of eminences of the parietal and frontal bones, the presence or absence of muscle marking, and the size of the supra-orbital ridges.

Burial 1 has a smooth appearance with no evidence of muscle marking present on the occipital bone. Because this individual may represent a young adult, it is possible that these morphological traits have not yet developed; otherwise, this individual is a very gracile female.

Burial 2 is missing the frontal bone, but the parietal region has large eminences. The overall smooth appearance of the calva, along with the large eminences, indicates the possibility that this individual is female.

The morphological data obtained by observing the calvas from Burials 4 and 12 indicate that they too represented females. Both burials exhibited an overall smooth architecture, small supra-orbital ridges, medium to large frontal eminences, large parietal eminences and a full forehead. Burial 12 also has muscle marking on the frontal and temporal bones.

Burial 6 appears to be male with small frontal and parietal eminences. Occipital muscle marking was also present.

Burial 8 contained a calva with no occipital bone. The sex was difficult to determine, but from morphological characteristics, it appears to be a male. The frontal and parietal eminences were small, the supra-orbital ridges are medium to large and the forehead was rounded and full.

Burial 24 was a left portion of a calva with smooth architecture, little occipital marking, large parietal eminences, and a full forehead with small frontal eminences. These traits suggest that the individual was a female.

One reconstructed calva from Feature 5 in 25L40 trench, labeled 38a, appeared to be male. Its male traits included a large general size, with a rugged appearance, and small parietal eminences. These observations were based on a portion of the frontal bone, fragments of both left and right parietal bones, and approximately one-half of the occipital bone.

In summary, the calvas from the McFayden Mound represented five individuals that were female and five that were male.

Observations of Morphological traits of Calvaria

Three calvarium, located in Burials 5, 11, and 13, represented three more individuals whose sex could be determined by observing morphological traits. Burial 5 is probably female. Traits of this calvarium display an overall smooth architecture, small supra-orbital ridges, large eminences, small mastoid processes, and little muscle marking in the occipital area.

Burials 11 and 13 both represent adults, based on observations of suture closure; however, it was difficult to determine the sex of these individuals. Both calvaria had a smooth architecture, little muscle marking, noticable parietal eminences and small to medium supra-orbital ridges, suggesting that they were from females. On the other hand, male features were seen in the small frontal eminences and less rounded forehead. In comparing these remains with the female cranium both calvaria generally appeared to be female.

Observations of Morphological Traits of the Frontal Bone

Finally, five frontal bones, all with supra-orbital ridges were compared with the other cranial remains for morphological similarities. From this analysis, it is suggested that Burial 9 is a subadult (younger than 15 years at the time of death), Burials 29, 30, and 31 may represent males with large supra-orbital ridges, and Burial 27 appears to be female.

The observation of eight calva, three calvarium, one cranium, and five frontal bones, enabled the sexing of some individuals represented at the McFayden Mound. A total of six males, nine females, and two possible sub-adults form the representative sample. Figure 8 compares the results of sexing the cranial remains.

Sexing Cranial Remains: Morphometrical Analysis

The technique of observing morphological traits to sex individuals represented by skulls without the mandible is probably no more than 80% accurate (Giles and Elliot 1953:53). This per cent of accuracy is lowered when the sample being observed is in a fragmented state due to environmental conditions such as erosion, root disturbance, and human disturbance. Another problem with this technique is the subjectivity present when describing differences between the sexes represented in the sample population. Howells notes "...where two observers examine the same series there is generally a disagreement between them as to the sex of ten to fifteen percent of the individuals" (cited in Giles and Elliot 1963:53).

Howells (1969 a and b) stresses the importance of objectivity in osteological studies, especially when exploring two main problems. These include first, the determination of the kinds of differences among populations of skeletons available. The degree and significance of these differences allow estimates of morphological "distance" to be made for these populations. The next step in this analysis of distance is to determine the cause or causes of their differences. The second problem common to osteological research concerns the identification of a

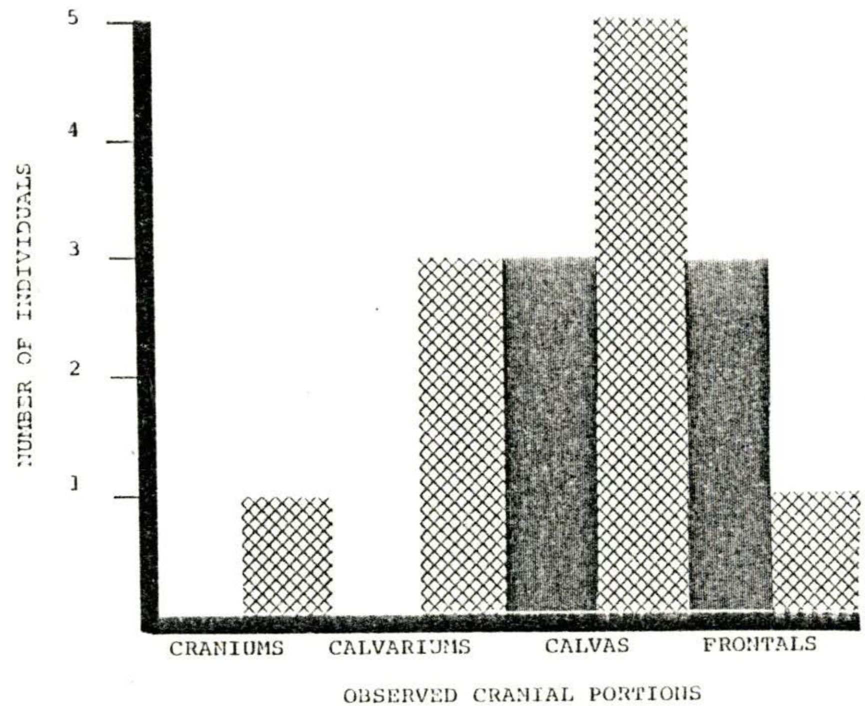
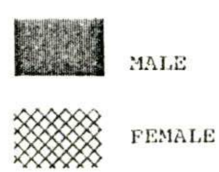


Figure 8.-- The number of males and females represented in the McFayden population determined by cranial morphology.



single specimen or a sample population, usually archaeological remains, with relation to known populations (Howells 1969b:311). This placement may include sexing and aging individuals as well as determining stature estimates of the population. Whatever the methods used to seek information about a population, the two problems discussed above can be dealt with objectively by using statistical techniques.

In addition to morphological analysis, the individuals represented by the cranial remains retrieved from the McFayden Mound were also sexed using a multivariate linear discriminate function. R. A. Fisher first introduced this technique in 1935, and since it has been applied in numerous studies. Discriminate analysis eliminates the problem of overlap common to morphological studies by assigning an individual to a sample classified into two or more groups on the basis of "p" variables characteristic of individuals present in the population sample. This technique does not attempt to identify heterogeneous material but merely assigns an individual to one category or the other based on suitable information (Giles and Elliot 1963:53). Discriminant function sexing of individuals using cranial and/or mandibular measurements increases the accuracy for American white and Negro populations to 88.3%, depending on the populations used and the "p" variables observed (Stewart 1979:88).

The discriminant function analysis devised by Giles and Elliot (1963) is used to sex the individuals represented by crania from the McFayden Mound. In their model, the sample can be categorized into two groups, male and female. The variables are anthropometric measurements "p", which range from four to five. These measurements include:

(1) Glabello-occipital length. Maximum length of the skull, from the most anterior point of the frontal in the midline to the most distant point on the occiput in the midline.

(2) Maximum width. The greatest breadth of the cranium perpendicular to the median sagittal plane, avoiding the supra-mastoid crest.

(3) Basion-bregma height. Cranial height measured from basion (midpoint on the anterior border of the foramen magnum) to bregma (intersection of the coronal and sagittal sutures).

(4) Maximum diameter bi-zygomatic. Maximum width between the lateral surfaces of the zygomatic arches measured perpendicular to the median sagittal plane.

(5) Prosthion-nasion height. Lowest point on the alveolar border between the central incisors to nasion (midpoint of the nasofrontal suture).

(6) Basion-nasion. From basion to nasion.

(7) Basion-prosthion. From basion to the most anterior point on the maxilla in the median sagittal plane.

(8) Nasal breadth. Maximum breadth of the nasal aperture perpendicular to nasal height.

(9) Palate-external breadth. The maximum breadth of the palate taken on the outside of the alveolar borders.

(10) Opisthion-forehead length. The maximum distance from opisthion (the midpoint on the posterior border of the foramen magnum) to the forehead in the midline.

(11) Mastoid length. The length of the mastoid measured perpendicular to the plane determined by the lower borders of the orbits and the upper borders of the auditory meatuses. The upper arm of the sliding calipers is

> aligned with the upper border of the auditory meatus and the distance to the tip of the mastoid is measured (Giles and Elliot 1963:58).

Finally, a discriminatory function can be utilized which is most effective in distinguishing the two sexes (Giles and Elliot 1963:53). In more simple terms the procedure is as follows: (1) Take the anthropometric measurements, x, x_z, ...x_j; (2) Compute Y, the discriminant function, from the measurements; (3) compare Y with the discriminant value: if the discriminant function is larger than the discriminant value the skull is male, if the reverse is true, the skull is female (Krogman 1978:119).

Due to the fragmented condition of the cranial remains from McFayden, only one cranium (South's burial) could be sexed using discriminant functional analysis. Nine cranial measurements were combined to total 21 discriminant functions derived to indicate sex in whites, Negroes, and the combined populations (Giles and Elliot 1963:60). The variations in the measurement combinations were employed to aid the researcher in finding a discriminant function suitable for a specimen. These combinations range from four to eight measurements. To apply the discriminant function each measurement on the specimen being examined is multiplied by the appropriate coefficient and the products added or subtracted as indicated.

Using eight of the measurements taken from "South's burial", which include, glabello-occipital length (181mm), maximum width (140mm), basion-bregma height (131mm), maximum diameter bi-zygomatic (124mm), basion-prosthion (94mm), prosthion nasion height (67mm), palate-external breadth (60mm), and mastoid length (29mm), the following equations are derived using Giles and Elliot's Table (Giles and Elliot 1963:60):

1. For white population:

   3.107 (181) - 4.643 (140) + 5.786 (131)
   + 14.821 (124) + 1.000 (95) + 2.714 (67)
   - 5.179 (60 + 6.071 (29) = 2650.274mm.

2. For Negro population:

   9.222 (181) + 7.000 (140) + 1.000 (131)
   + 31.111 (124) + 5.889 (95) + 20.222
   (67) = 30.556 (60) + 47.111 (29) =
   8085.134.

3. For combined Negro and white populations:

   6.083 (181) = 1.000 (140) + 9.5 (131) +
   28.250 (124) + 2.250 (124) + 2.250 (95)
   + 9.917 (67) = 19.167 (60) + 25.417 (29)
   + 6173.785.

Comparing these three sums, 2650.247, 8085.134, and 6173.785 with the sectioning points calculated in Giles and Elliot's Table for the respective populations, we see that all three indicate a female, but all sums are above the means given for the female. Perhaps this above-average calculation is due in part to the application of a native American population to a model devised for American white and Negro populations. These functions have been tested using American Indian populations from Indian Knoll Kentucky (Snow 1948) dating to 3450 B.C.; Pecos Pueblo, New Mexico (Hooten 1930); and Florida (Hrdlicka 1940). The measurements taken on these populations by their respective researchers were applied to the discriminant functions by Giles and Elliot, calculated for the combined white and Negro populations. Each population is accompanied by a limitation. Both the Indian Knoll and Florida populations, for instance, lacked mastoid length measurements, preventing the application of the majority of discriminant functions. The Pecos Pueblo population practiced head deformation, limiting their application to the model. Giles and Bliebtreu (1961) demonstrate that there was no significant differences between deformed and undeformed skulls for basion-prosthion length, but that there were for cranial length and breadth (Giles and Bliebtreu 1961). However, discriminant function Number 13 omits these three measurements, thus making functional analysis again useful. Table 11 illustrates the percentage of accuracy in sexing these three American Indian populations using the discriminant function technique.

It is suggested by Giles and Elliot that the sectioning point for males and females should be adjusted for American Indian population to increase the percentage of accuracy (Giles and Elliot 1963:67). However, until a population can be obtained where the sexes of the individuals are absolutely known, sectioning points useful in discriminant analysis cannot be determined which are applicable to American Indian skeletal remains. Even then, the diversity of aboriginal populations (Neumann 1952) through time and space may limit the application considerably. For the purpose of this study, where discriminant function analysis

TABLE 11:

PERCENTAGE OF THREE AMERICAN INDIAN POPULATIONS
CORRECTLY SEXED, FROM GILES AND ELLIOT (1963:66)

Discrim-inant function number	Undeformed				Indian Knoll				Florida			
	Per-centage correct Negro	White	N	Sample section-ing point	Per-centage correct Negro	White	N	Sample section-ing point	Per-centage correct Negro	White	N	Sample section-ing point
3	81.2	78.1	32	6289.81								
6	76.9	82.1	39	6062.14								
9	83.3	83.3	42	6190.88								
10	79.4	82.4	34	3741.55	91.9	90.8	271	3734.60	64.7	90.7	116	3917.07
13	87.9	75.8	33	1110.21								
16	80.8	80.8	52	1494.65								
17	82.0	88.0	50	2589.10	90.7	89.2	344	2568.28	70.0	85.3	217	2702.21
18	79.4	85.3	34	4009.93	90.3	87.3	267	4006.01	61.8	92.7	110	4190.63
21	86.0	83.7	43	909.48	91.0	90.3	267	903.28	65.4	89.7	107	944.82

N = sample size

was used to support morphological observations, utilization of Giles and Elliot's method seems reasonable.

Sexing Mandibular Remains: Morphological and Morphometrical Analysis

The mandibles present in the McFayden sample were observed morphologically and morphometrically to determine sex. The results of both studies were then compared for overlap and differences.

Morphologically a mandible belonging to a male appears more rugged, with a square chin and large teeth. The mandible of a female is more gracile, the chin is rounder, usually with a point and the teeth are smaller (Bass 1971:73; Stewart 1979:88). One may think that the size of the mandible would be the most important factor in determining sex, but the features described above are more characteristic of the two sexes and should be observed, rather than mere size (Stewart 1979:88). Plate 1 illustrates the morphological differences between a male and female mandible from the McFayden Mound. Many of the mandible fragments could not be sexed using morphological differences, as the chin areas were absent. Out of twenty-three fragments observed to determine the sex, thirteen appear to be male and ten female. The details of the observations are listed in Table 12.

As a component of the skull, the mandible is the most easily sexed portion of the skeleton next to the pelvis. Sex characteristics of the mandible, however, are not as abundant as those of the calvarium nor are they as reliable

PLATE 1: MALE (LEFT) AND FEMALE (RIGHT) FROM Bw^{o}67 AND MALE (BOTTOM) FROM Nh^{v}28 ILLUSTRATING MORPHOLOGICAL DIFFERENCES.

TABLE 12:

MORPHOLOGICAL OBSERVATIONS OF MANDIBLES TO DETERMINE SEX

Burial #	Size	Chin Shape	Tooth Size	Sex
1	Large	-	Large	M
2a	Very Robust	Square	-	M
2b	Robust	Square	-	M
3	Robust	Square	-	M
4	Medium	Round w/point	-	F
6	Small/Smooth	Round w/point	-	F
7	-	-	Large (Frag. Rt)	M?
8a	Robust	Round	-	M?
8b	-	Round w/point	-	F
9	Robust	Square	-	M
10	-	-	Med/Lg. (Frag. Left)	M?
23	Small/Smooth	Round w/point	Small	F
24	Small	-	Small/Medium (Left. Frag.)	F
26	Robust	Square	- (Left. Frag.)	M
27	Medium/Smooth	Square	Medium	M
29a	Robust	Square	-	M
29b	Medium	Round	Small	F
31	Robust	Square	-	M
38a	Gracile	Round w/point		F
38b	Robust	Square	Large	M
38c	Gracile	Round	Small	F
38d	Small	Round	(AR) - Old Adult	F
38e	Small	Round	- (Frag. Chin)	F

Total 23 Large Fragments Possible
10 F
13 M

(AR) - Alveolar reabsorption

for sex determination (Giles 1964:129). Several anthropologists have described sex-differentiating features of the mandible as qualitative in nature (Bass 1971; Krogman 1978; Stewart 1979), yet anatomically sexing isolated mandibles is difficult. Furthermore, morphological observations are prone to the subjectivity of the researcher, thereby decreasing this method's accuracy. To support such analysis, the multivariate discriminate function technique devised by Giles (1964) is used to sex the mandibles present in the study sample. Giles' method is 85% accurate for Negro and white populations (Giles 1964:129). Although no study is available of American Indian populations, Giles' method was adopted for this study to augment morphological analysis.

Nine measurements can be taken. All require only sliding calipers and are taken to the nearest millimeter. These measurements and their definitions are:

> 1. Mandibular symphysis height. Height from the lowest median point on the jaw to the lower alveolar point.
>
> 2. Bigonial diameter. The maximum diameter externally on the angles of the jaw (gonion).
>
> 3. Mandibular ramus maximum breadth. The distance between the most anterior point on the mandibular ramus and the line connecting the most posterior point on the condyle and the angle of the jaw.
>
> 4. Mandibular ramus minimum breadth. The smallest antero-posterior diameter of the ramus.
>
> 5. Mandibular body thickness. The thickness of the body measured at the level of the second molar parallel to the vertical axis of the body.

6. Mandibular body height. Mandibular body height measured between the first and second molars.

7. Mandibular ramus height. Measured from the upper-most point on the condyle to the middle of the inferior border of the body parallel to the vertical axis of the ramus.

8. Mandibular body length. From the most anterior point on the symphysis to an imaginary point formed by the posterior margin of the ramus and the anteroposterior axis of the body and measured parallel to the axis.

9. Bicondylar breadth. Measured between the lateral surfaces of the mandibular condyles (Giles 1964:130-131).

The measurements taken on the McFayden sample include mandibular symphysis height, ascending ramus height, and bigonial diameter. The fragmented condition of these mandibles limited the number of measurements taken to these three, thereby decreasing the accuracy that would be possible from a larger number of measurements. In many cases, estimates of measurements were made where the bone had been damaged. In these instances, the estimates are probably lower than the actual measurement, further impairing the accuracy of discriminant functional analysis for this particular sample.

The mandible fragments were measured and the results inserted in the equations for white, Negro, and combined white and Negro populations. For example, the mandible present with Burial 4 measures 299mm (millimeters) 66mm and an estimated 92mm, for sympheseal height, ascending ramus height, and bigonial breadth respectively. Computing these measurements in the formula devised for the combined white and negro populations, the sum is 252.001mm. This total falls well below the sectioning point for this population, calculated as 261.83mm. Therefore, it is suggested that this individual represents a female. Table 13 illustrates the results using discriminant functional analysis of the mandible as a sex determinant. Three males and three females are recognized in the McFayden sample.

In conclusion, twenty-three mandible fragments were observed morphologically and morphometrically to determine the sex ratios in the McFayden sample. The results of the morphological study indicate that 13 males and 10 females are represented. Using the multivariate discriminate function analysis, 4 of these 23 mandibles are sexed as male and 3 as female. The other 16 mandibles, because of poor preservation, produced indices that could not be used in the morphometrical analysis.

When the results of the two methods are compared, there is a 100 per cent correlation in the seven mandibles that could be analysed by both techniques (seven out of seven matching in probable sex). From these results, it may be assumed that mandibles sexed solely using morphological indices are correct.

Sexing Individuals Using Post-Cranial Skeletal Remains

Three methods were used to sex individuals represented by post-cranial remains from the McFayden Mound. The first

TABLE 13: SEXING MANDIBLES USING DISCRIMINANT FUNCTION ANALYSIS

	Individual Measurements			Sums			
Burial #	Mandibular Sympheseal Height	Mandibular Ramus Height	Bigonial Diameter	White Pop.	Negro Pop.	Combined Pop.	Sex
1	-	-	106*	-	-	-	-
2a	32*	64**	110*	301.936	279.46	275.13	M
2b	31*(AR)	65**	95*	287.85	264.84	261.16	M ?
3	33	67*	106*	306.238	283.816	278.343	M
4	29	63	92*	277.462	256.052	252.001	F
6	22	-	-	-	-	-	-
7	-	-	-	-	-	-	-
8a	31	64**	106*	296.546	272.371	270.118	M
8b	28*	-	-	-	-	-	-
9	29*	-	-	-	-	-	-
10	-	-	-	-	-	-	-
23	30	-	-	-	-	-	-
24	-	-	102*	-	-	-	-
26	34	-	-	-	-	-	-
27	31	-	-	-	-	-	-
29a	26*(AR)	62*	112	290.988	265.872	266.986	M
29b	-	61*	92*	-	-	-	-
31	-	-	108*	-	-	-	-
38a	32	60*	100*	282.72	260.98	256.8	F
38b	29	-	-	-	-	-	-
38c	-	-	-	-	-	-	-
38d	-	-	-	-	-	-	-
38e	-	-	-	-	-	-	-

Sectioning Points[1]		
White Pop.	Negro Pop.	Combined Pop.
287.43	265.74	261.83

* Estimated From Fragment

** Mean to nearest even number of mandibular symphysis height for males and females of White and Negro Population (See Giles 1964; 131)(64.557)

(AR) Avedlar Reabsorption Evident

1 Giles and Elliot 1964, p. 132.

involved measuring the circumference of the femur to determine the sex of an individual. The second method was a discriminant functional analysis where the talus and calcaneus (both foot bones) were measured and the results transformed into equations, the sum of which indicates whether a male or female is present. The final technique involved observing morphological differences in male and female innominates.

The poor condition of the skeletal sample permitted the measuring of only 49 femora (22 right; 27 left) for circumference. In most instances, the femur was not complete, and the midshaft region was estimated. The method of sexing individuals using femur circumference was first introduced by Black, who demonstrated that it was 85 per cent accurate when tested on 114 skeletons from the Libben Site in Ohio (Black 1978:227). The circumference was measured with a cloth tape, which conformed better to the femur shape than a steel shape. From this study, Black (1978) suggested that a female was represented when the circumference was less than 81 millimeters and a male was indicated by measurements over 81 millimeters. Any quantity equaling the function itself (81 millimeters) was deemed "indeterminate" in regards to sex (Black 1978:228-229).

A steel tape was used to measure the circumferences of the 49 femor present in the McFayden sample. The measurements ranged from 70 to 90 millimeters. There was a continuous regression from 90 to 85 millimeters and from 82 to 70 millimeters in the femur circumferences. The mean calculated for the entire population sample was 83.10. Using this figure as the sectioning point to determine sex, the midpoint between the male mean (85.07) and the female mean (80.76) was 82.91 millimeters. Computing a new function placed the sectioning point at 83 millimeters for the McFayden population.

Table 14 lists the circumference measurements and estimated sex of the individuals represented by femora. Twenty-six femurs were designated as belonging to females while 23 are males. The minimum number of individuals represented in this femur sample was 27 as indicated by left femurs, 14 of which are female and 13 male.

There are obvious limitations in sexing individuals using femur circumference. A sectioning point devised from one population should never be used to determine the sex ratio of another. Thus, a new function must be computed for each population. Second, the 85 percent accuracy of this method is based on a prehistoric population, where the true sex of any individual is uncertain. Finally, it has not yet been determined whether age was a critical factor affecting sex determinations using this method (Black 1978:1930). Despite these complications, the use of femur circumference as an indicator of sex was ideal for prehistoric skeletal remains, especially secondary burial remains where long bones often are fragmented.

The estimation of sex determined by the talus and calcaneus involves discriminant function analysis. Two

TABLE 14: SEXING INDIVIDUALS FROM $Bw^{O}67$ USING FEMUR CIRCUMFERENCE

Square	Feature	Circumference Right Femur	Circumference Left Femur	Sex
20L30	2	80*		Female
		94*		Male
			74	Female
			80	Female
			86*	Male
20L40	0-.3'	88*		Male
			88*	Male
			89*	Male
	.5-.8'		77*	Female
25L40	3	84*		Male
		87*		Male
			80*	Female
			84	Male
			87*	Male
	5	70*		Female
		75		Female
		75*		Female
		77*		Female
		80*		Female
		81*		Female
		81*		Female
		81*		Female
		81*		Female
		81*		Female
		81*		Female
		82*		Female
		85*		Male
		88*		Male
		88*		Male
		89*		Male

Square	Feature	Circumference Right Femur	Circumference Left Femur	Sex
25L40	5		71*	Female
			76*	Female
			78*	Female
			80*	Female
			81*	Female
			81*	Female
			86*	Male
			87*	Male
			87*	Male
			87*	Male
			88*	Male
			89*	Male
	6		73*	Female
	8		87*	Male
25L47.5	6		73*	Female
			90*	Male
20L50	1	88*		Male
			70	Female
			80*	Female
	2	89*		Male

	Right	Left	Minimum No. Individuals	$\bar{X}$
Male	10	13	13	85.07
Female	12	14	14	80.76
Total	22	27	27	

* Circumference of midshaft estimated

measurements taken on the calcaneus and five on the talus were substituted in discriminant functional equations designed by Steele (1974:585). Comparing the sums of these equations with computed sectioning points indicated whether a male or female was present.

The following measurements on the calcaneus were used:

1. Body height: defined as the greatest projected height of the calcaneus, and measured from the most inferior point of the tuberosity of the calcaneus to the most superior point of the posterior facet of the calcaneus.

2. Load arm length: defined as the projected line from the most posterior point of the posterior articular surface for the talus, to the most anterior/ superior point of the cubordal facet (Steele 1974:528).

The five measurements taken on the talus were as follows:

1. Maximum length: defined as the projected line from the sulcus for the flexor hallucis longus muscle at the posterior aspect of the talus to the most anterior surface for the navicular.

2. Width of the talus: defined as the maximum projected line laberally/ medially perpendicular to the sagittal plane.

3. Body height: defined as the maximum height of the body in an inferior/ superior plane.

4. Maximum length of the trochlea for the tibia: defined as the maximum length of the trochlear surface in an anterior/ posterior plane.

5. Maximum width of the trochlea: defined as the width of the trochlea surface at the midline, perpendicular to the projected line for the maximum length

of the trochlear surface (Steele 1974: 582:583).

Only four calcanea (two right and two left) were present in the McFayden sample and only three of these could be measured. Table 15 provides the body height and load arm width measurements, along with the computed sums and sex estimations for each. All three were female. It should be noted that discriminant function analysis using the calcanea will provide the sex of the individual with only 60 per cent accuracy (Steele 1974:585).

Measurements for the 13 tali (six right and seven left) in the sample are shown in Table 16. Of the 10 specimens for which computations could be made, eight appear to be female and two male. In some instances fragmentation of the bone prevented obtaining exact dimensions, and estimates were used. Discriminant function analysis using the tali provides 83 to 88 per cent accurate in sexing individuals (Steele 1964:585).

Table 17 compares the individual measurements for the tali and calcanea derived from the McFayden sample with the means calculated from two other aboriginal sites, the Larson Site in South Dakota and the two combined Pueblo sites in New Mexico, Pueblo Bonito and Hawikuh (Steele 1974:584, 585). The measurement of talus length at McFayden Mound compares favorably with the Larson Site means computed for males and females. However, the means for talus width and calcaneus body height resemble the Pueblo sites. This is a good illustration that variability in bone size exists

TABLE 15:

SEXING CALCANEA USING DISCRIMINANT FUNCTION ANALYSIS

Square	Feature	Side	Body Height	Load Arm Width	Sum	Sectioning Point	Sex	Percent Accuracy
20L30	2	LT	35.0	32.0	26.00631	32.00	Female	79
25L40	2	RT	44.0	-	-	-	-	-
	5	RT	41.0	35.0	29.42481	32.00	Female	79
		LT	41.0	37.0	30.26137	32.00	Female	79

	LEFT	RIGHT	MINIMUM NO. INDIVIDUALS
Male	0	0	0
Female	2	1	2
TOTAL	2	1	2

TABLE 16: SEXING TALI USING DISCRIMINANT FUNCTION ANALYSIS

Square	Feature	Side	Maximum Length	Maximum Width	Body Height	Width/ Length	Trochlear Width / Trochlear Length	Sum	Sectioning Mean	Sex	Percent Accuracy
20L30	2	Lt.	48.0	40.0	28.0	-	.87	47.4389	50.05	Female	88
20L40	0-3'	Lt.	-	37.0	29.0	-	.93	-	-	-	-
	.8-1.3	Lt.	47.0	39.0	28.0	-	-	35.7683	38.75	Female	83
25L40	Surface	Rt.	54.0	41.0*	32.0	.76	.96	51.5535	50.05	Male	88
		Rt.	45.0*	37.0	29.0	-	-	34.1064	38.75	Female	83
		Rt.	-	33	28.0	-	-	-	-	-	-
	5	Rt.	46.0*	34.0	33.0	.73	.87	44.7930	50.05	Female	88
		Lt.	47.0	34.0	33.0	.72	.85	44.9910	50.05	Female	88
		Rt.	41.0	28.0	19.0	.68	.95	39.1325	50.05	Female	88
		Rt.	43.0	-	26.0	-	-	-	-	-	-
		Lt.	48.0	37.0	29.0	.77	.87	46.2938	50.05	Female	88
		Lt.	53.0	40.0	34.0	.75	.88	50.2735	50.05	Male	88
		Lt.	50.0	38.0*	33.0	.76	.87	48.0375	50.05	Female	88

	Left	Right	Minimum No. Individuals
Male	1	1	1
Female	5	3	5
Total	6	4	6

* Measurements are estimated

TABLE 17:

MEASUREMENTS OF CALCANEA AND TALI FROM Bw°67 COMPARED WITH OTHER SITES

Site	Square	Feature	Sex	No.	Max. Length Talus	Max. Width Talus	Body Height Calcaneous
Larson Site			M	20	$\overline{54.4}$	$\overline{44.0}$	$\overline{48.0}$
			F	20	$\overline{48.8}$	$\overline{38.8}$	$\overline{41.8}$
Pueblo			M	26	$\overline{49.6}$	$\overline{40.6}$	$\overline{44.8}$
			F	23	$\overline{44.4}$	$\overline{36.9}$	$\overline{39.1}$
Bw°67	20L30	2	F	1 Lt.	48.0	40.0	
			F	1 Lt.			
	20L40	0-3'	-	1 Lt.		37.0	
		.8-1.3	F	1 Lt.	47.	39	
	25L40	Surface	M	1 Rt.	54.	41	
			F	1 R.	45	37	
			-	1 Rt.		33	
		2	-	1 Rt.			44
		5	F	1 Rt.	47	34	
			F	1 Rt.	46	34	
			F	1 Rt.	41	28	
			-	1 Rt.	43	-	
			F	1 Lt.	48	37	
			F	1 Lt	53	40	
			F	1 Lt.	50	38*	
			F	1 Rt.			41
			F	1 Lt.			41
Bw°67 (Means)			F	8	$\overline{46.5}$	$\overline{36.87}$	
			M	2	$\overline{53.5}$	$\overline{40.5}$	$\overline{39}$

* Measurements are estimated

between prehistoric aboriginal populations as well as "modern" populations.

This discriminant function method for sexing individuals using the talus and calcaneus can be applied easily to secondary burial remains for, as mentioned earlier, the foot ligaments often regard decomposition. Steele cautions that a new sectioning point must be calculated if a population differs in bone size from the study population he describes. Although the accuracy is rather low for the calcaneus, sums computed for the tali are accurate up to 88 per cent of the time. Furthermore, Steele's method has been successfully tested using different populations (Steele 1974:587).

Present in the McFayden population were seven innominate fragments that could be sexed by observing male and female morphological differences. In general, the female innominate is broader, whereas that belonging to a male tends to be heavier and more robust. The sciatic notch is usually wider for the female, measuring approximately 60 degrees, whereas the narrower male sciatic notch forms an angle of about 30 degrees. Another difference is that the auricular area is raised on the female innominate, but is flatter on males. Other differentiating characteristics include the presence of a preauricular sulcus and a larger pubis in females, and a larger acetabulum in males. (Stewart 1979:104-110).

Because of the fragmented condition of the sample from the McFayden Mound, only the sciatic notch width, the

the presence or absence of a preauricular sulcus, and the shape of the auricular area were observed for sex determination. Table 18 lists the results of these observations. Four females and one male were distinguished by right innominates fragments, and two females by left fragments. As mentioned earlier the pelvis alone can be sexed with 95 per cent accuracy. This accuracy was certainly lessened, however, by the friable nature of the innominate, and this method should be regarded as an additional check to the other means of sexing.

To summarize, four postcranial bone types, the femur, the talus, the calcaneus, and the innominate were sexed using either morphological or morphometrical methods. Sexing the left femora using circumferences of the midshaft gave a minimum number of 13 males and 14 females. Discriminate function analysis used on the tali indicated the presence of a minimum number of five females and one male. For the calcanea a minimum number of 2 females were identified using discriminate function analysis, and a minimum number of four females and one male were represented by right innominate fragments observed for morphological differences. Figure 9 illustrates the results of all the methods used to sex both cranial and postcranial remains along with their percentage of accuracy. From Figure 9, it was evident that the larger the sample of each bone type, the more balanced the male-female ratio. The greater quantities of bone types were represented by femora and cranial remains. The

TABLE 18:

MORPHOLOGICAL DIFFERENCES OF INNOMINATES FROM Bw°67
AND ESTIMATED SEX OF INDIVIDUALS REPRESENTED BY THEM

Square	Feature	Side	Sciatic Notch	Preauricular Sulcus	Auricular Area	Sex
20L30	1	Left	Wide	Present	Raised	Female
25L40	5	Right	Wide	-	-	Female(?)
		Right	Wide	Present	Raised	Female
		Right	Narrow	Absent	Flat	Male
		Right	Wide	Present	-	Female
		Right	Wide	-	-	Female(?)
		Left	Wide	Present	Raised	Female

	Left	Right	Minimum No. Individuals
Male	0	1	1
Female	2	4	4
TOTAL	2	5	5

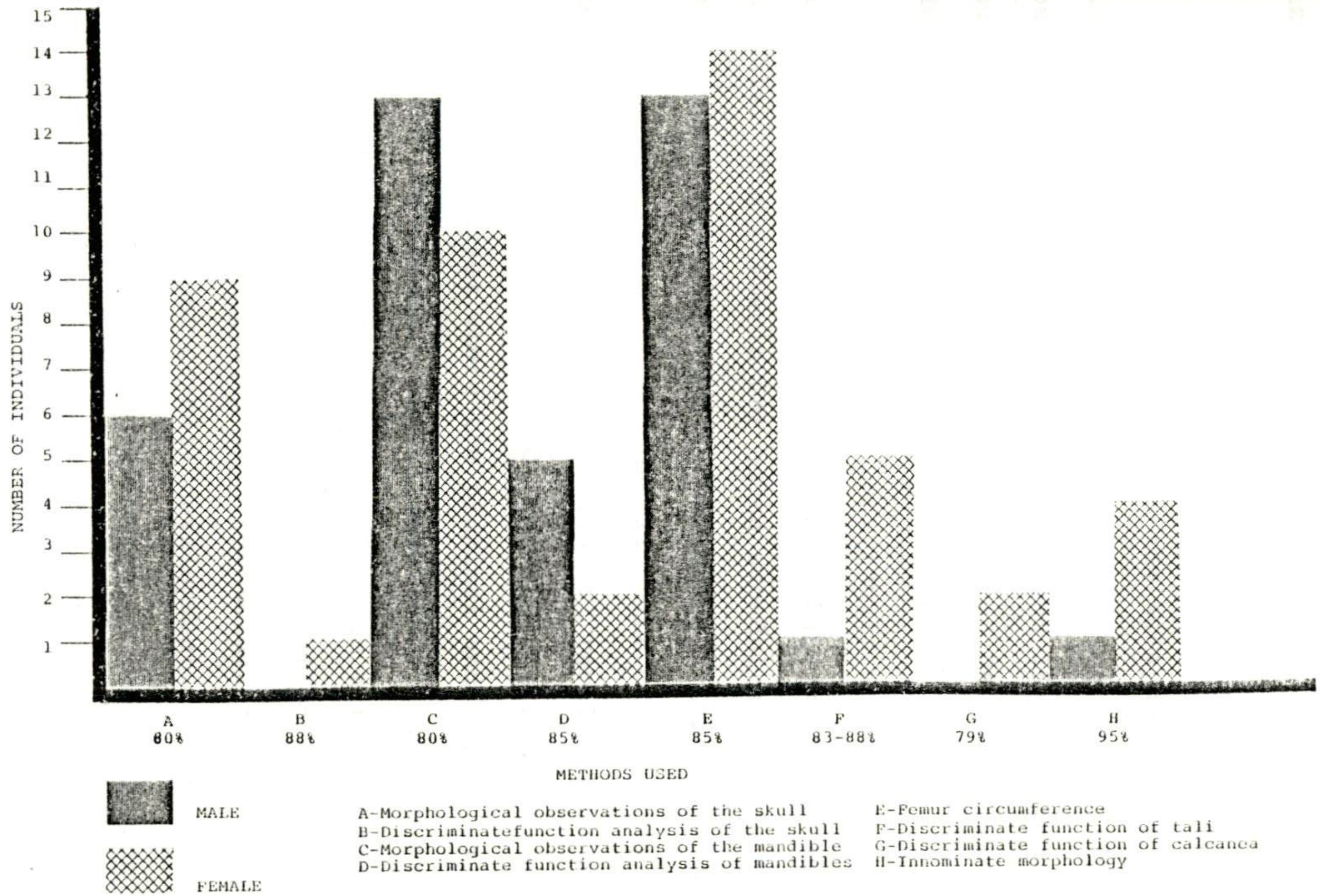


Figure 9.--Total number of males and females represented and the relative percentage of accuracy for each method used to sex the McFayden population.

smaller and more friable postcranial remains indicated significantly higher percentages of females, but the sample sizes were small.

Dental Development: Aging Subadults at Death

Individuals represented in the McFayden Mound population were placed into categories according to age. These four categories included subadults aged 15 and under, young adults aged 15 to 25, adults aged 26 to 40, and old adults aged over 40 at the time of death.

When attempting to age individuals at the time of death, it is best to employ as many skeletal parts as possible. The criteria for aging subadults include dental development (calcification and eruption), long bone maturation, and the degree of epipheseal union of the long bones. The poor condition of the post-cranial remains from McFayden has limited the use of the methods incorporating long bones, especially in cases where the proximal and distal ends of the shafts are absent. Dental development, on the other hand, is the most accurate criterion for aging subadults. Research indicates that dental calcification and eruption is more closely correlated with the actual age of such individuals than post-cranial development. Furthermore, the environment has little influence on calcification except in instances where diseases such as syphilis and hypopituitarism have modified development (Ubelaker 1978:46).

Studies concerning the dental development of American Indian populations are limited to the eruption of permanent teeth. Ubelaker has devised a dental chart for American Indian subadults that combines research by Bahlberg and Menegaz-Boch (1958) and Steggerda and Hill (1942), with chronologies of deciduous eruption and the calcification of deciduous and permanent teeth obtained from white populations in the United States (Ubelaker 1978:47-47).

Ubelaker's chart is probably the most accurate resource for aging the subadults in the McFayden sample. The teeth present in the sample and age estimations are given in Table 19. Deciduous teeth are identified by Roman numerals I-VIII. This scale represents the degree of attrition used to age adults, with I indicating no presence of wear and VIII representing a high degree of dental attrition. Arabic numerals 0-9 are used to show permanent teeth, with 0 representing an unerupted permanent tooth and numbers 1-9 denoting increasing amounts of attrition. Aging was limited to individuals represented by teeth that are in situ, fit in the alveoli, have similar morphology and development, have matching wear facets, and/or have similar degrees of attrition.

Six subadults were identified from the dental remains of the McFayden population. Maxillary and mandibular teeth from the child burial and Burial 38 represented two individuals aged 4 years $\pm$ (plus or minus) 12 months. Burial 31 also had correlating mandibular and maxillary development, which suggested the presence of one more individual aged 6 years $\pm$ 24 months. Two more individuals of this same age were indicated by unerupted left mandibular premolars in

TABLE 19: SUBADULT DENTITION

Maxillary

Location	RT	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	LT	Age In Years*
Child Burial				0	I	I							I	I	0				3-4 ± 12
Burial 27						I							0 I	0	0				6 ± 24
Burial 31						I						0	I						6-7 ± 24
Burial 35						0													6 ± 24
Burial 38				/0	IIIc			0		0	0	0			0/				4 ± 12
Total Diciduous		-	-	-	2	3	0	0	0	0	0	0	3	1	-	-	-		
Total Permanent		0	0	2	0	1	0	1	0	1	1	2	1	1	3	0	0		
Total Combined		0	0	2	2	4	0	1	0	1	1	2	4	2	3	0	0		

0 Unerupted Perm. Teeth
1-9 Wear on Perm. Teeth
I-VIII Wear on Dicid. Teeth
C Occlusal Carie = 14% of Total Diciduous Teeth

____ Teeth are in situ or alveolus is present
---- Teeth matched from same location but no alveolus present
/‾ _/ Indicates teeth and alveolus believed to be from same individual

TABLE 19 (CONT'D)

SUBADULT DENTITION

Mandibular

Location	RT 8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8 LT	Age
Child Burial			I	I						I		I	I	0			3-4 ± 12
Burial 18	0																15 ± 36
Burial 21										0	0	0	0				6 ± 24
Burial 25				[0	0	0		0				0] / I	II				6 ± 24
Burial 26									0								6 ± 24
Burial 31				Vc	I								Vc				6-7 ± 24
			[0	0	0	0					0	0	0	0]			
Burial 38				I								I					
									[0	0				0] / 0			4 ± 12 6 ± 24
Total Diciduous	-	-	-	3	2	0	0	0	0	1	0	3	3	-	-	-	
Total Permanent	1	0	1	2	2	2	0	1	2	2	2	3	2	4	0	0	
Total Combined	1	0	1	5	4	2	0	1	2	3	2	6	5	4	0	0	

0 Unerupted Perm. Teeth
1-9 Wear on Perm. Teeth
I-VIII Wear on Dicid. Teeth
C Occlusal Carie = 14% of Total Diciduous Teeth

____ Teeth are in situ or alveolus is present
---- Teeth matched from same location but no alveolus present
[ ] Indicates teeth and alveolus believed to be from same individual

Burials 21 and 25. One erupted right mandibular third molar in Burial 18 represented the sixth subadult, aged 15 years ± 36 months. A seventh subadult may be represented by the presence of deciduous maxillary premolars, and permanent unerupted premolars and molars, in Burial 27. However, since Burials 24, 25, 26, and 27 were all in the same vicinity within the 20L40 square, but at various depths, it was likely that these subadult dental remains belonged to an individual already identified from these burials.

During analysis, an unerupted left maxillary lateral incisor was noted in Burial 38. The tooth cingulum and the marginal ridges were so developed that the tooth appeared barrel shaped when compared with the shovel shaping characteristic of American Indian incisors (Lasker and Lee 1957: 404). Plate 2 shows this incisor along with other subadult maxillary incisors.

Aging Adults Using Dental Attrition

After dental development and epipheseal closure have been completed, it becomes more difficult to age an individual at the time of death. The poor preservation of skeletal remains from the McFayden Mound makes the more reliable observation that often are used for aging adults impossible. These observations include changes of the sympheseal face of the os pubis (Todd 1920 and McKern and Stewart 1957) and the degree of osteon formation is an indicator of age (Kerley 1965). Less reliable observations for determining age are suture closure and dental attrition.

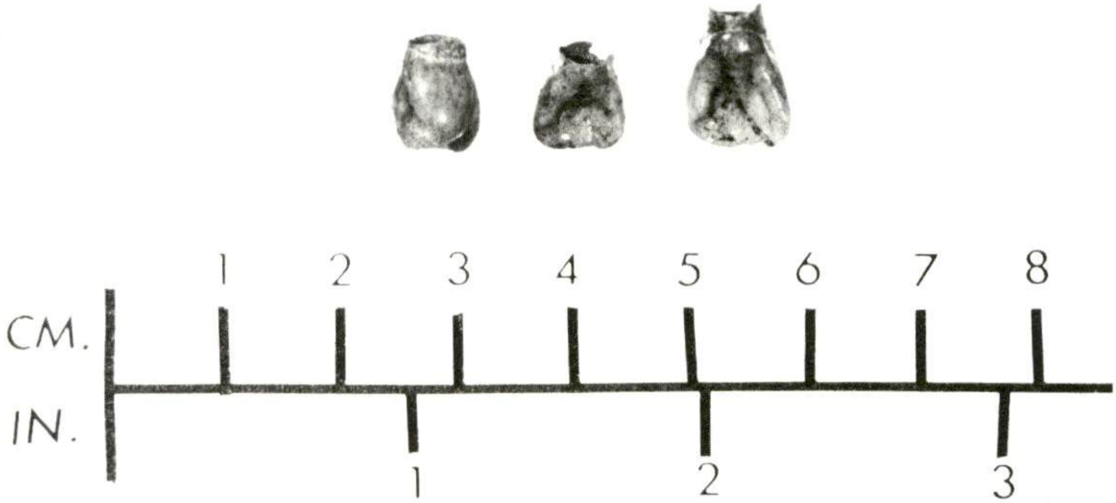


PLATE 2: SUBADULT MAXILLARY INCISORS FROM BURIAL 38 ILLUSTRATING BARREL (LEFT) AND SHOVEL SHAPING (MIDDLE AND RIGHT).

PLATE 3: THREE MANDIBLES SHOWING DIFFERENT DEGREES OF DENTAL ATTRITION.

The hard structure of the teeth makes them the most durable component of the human body, allowing them to remain intact after being buried in the ground for many years (Anderson 1962:76). Dental attrition, or wear, proceeds continuously throughout life, and is affected by environmental conditions such as diet, genetic factors such as occlusion and morphology; and cultural practices such as use of the teeth as tools. Generally, prehistoric populations exhibit much more wear than modern ones. There is also considerable variability in attrition rates, not only between groups but between individuals belonging to the same group, and even between different teeth in the same mouth (Ubelaker 1978:63-64).

Attrition was assessed for the adult mandibular and maxillary teeth in the McFayden remains. The degrees of wear and alveola reabsorption, related to antemortem tooth loss, provided a general area of an individual's age. In Tables 20 and 21 stages of dental attrition are represented by the Arabic numerals 1 through 9. These 9 stages of wear, adapted from Murphy (1959a:167-171 and 1959b:179), are as follows:

1. Tooth at occlusal level but no dentine is exposed.

2. Incisors - horizontal slit of dentine exposed.
   Canines - dentine exposed in the shape of a diamond.
   Premolars and Molars - dentine exposed on one cusp.

3. Incisors - exposed dentine line widened.
   Canines - exposure of dentine becomes more lateral.

TABLE 20: MAXILLARY TEETH

Location	Rt. 8	7	6	5	4	3	2	1	Lt. 1	2	3	4	5	6	7	8	Age	Unid.
South's Burial		5	5	4	4	4		5	5	5	5	3	3	5	4		26-33	
Burial 1															2			
Burial 3	6	7		7		2						7	7		8d7m		35-50	1
Burial 4																7		
Burial 6	8d				3 3	4		4	4								26-33	
Burial 7		2	2									2		2	2		18-25	
Burial 8	5				3													2
Burial 9	1	5o	6											4o			26-33	
Burial 16	1o	2	3	1	1	2					1 1	1	1	3	2	1	18-25	
Burial 21	3m			2	3	3		4						3	3	1	26-33	
Burial 24		2													1			1
Burial 25															5			
Burial 26														8	6	1	33-50	
Burial 27		1		3			5										26-33	
		2	3o	3								2		3			26-33	
														2	3	1		
Burial 28			6								5				4 2		26-33	
Burial 29		8 6	md 4	m 23	m 3m							4			4	1 8		
Burial 30		2 7m		7	1	7					6			2			35-50	
Burial 31		1 1	2	3		1					2	2			2		18-25	
Burial 32						1						1						
Burial 35		1			4			1				3	2			1	18-25	
Burial 38 a			4									2		4	2		26-33	
b		8		8	8	8					8	8	8				60-70	
c		3	2														18-25	
d						2		3			2	2			2 dm 7	1 6	18-25	
TOTAL TEETH	14	12	9	9	10	10	1	5	2	1	8	12	5	10	17	11		5

TABLE 20:
ADULT MAXILLARY TEETH
(cont'd)

TOTAL CARIES

O	Occlusal	Carie	4	25%	3%
M	Meseal	Carie	8	50%	3%
d	Distal	Carie	4	25%	6%
b	Buccal	Carie	0	0	0
l	Lingual	Carie	0	0	0
				100%	12%

Total Teeth 136 = 12%
Caries 16

1-9 Wear of Permanent Teeth

___ Teeth are insitu or alveolus is present

--- Teeth matched from same location, but no alveolus present

/‾ ‾/ Indicates teeth and alveolus believed to be from same individual

TABLE 21: ADULT MANDIBULAR TEETH

Location	RT 8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8 LT	Age	Unid.
Burial 1	4	5	6	3*													26-33	
															3	4 o	26-33	1
	7m																	
Burial 2			9															
Burial 4	7										2							
														6	6	5o*	33+	2
Burial 6											2				3	2b		
			[3												3	2]	26-33	
		2													2			
Burial 7																2b		
Burial 8												6	6				35-50	
															1			1
Burial 10													5	7			35-50	
Burial 18		?	5d														33-50	
	1											2			4			
Burial 21			2											3	1	2		1
Burial 23	3o	4	4	3							3	?	2	3	2	2	26-33	
Burial 24 a															6	5	33-50	
b													[	1	1]		18-25	
		2											5					

*Mandible fragments belong to the same individual

1-9 Wear of permanent teeth
____ Teeth are insitu or alveolus is present

---- Teeth matched from same location but no alveolus present

[ ] Indicates teeth and alveolus believed to be from said individual.

TABLE 21 (CONT'D)

ADULT MANDIBULAR TEETH

Location	RT	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	LT	Age	Unid.
Burial 25			3																	
		8																		
Burial 26			7d	A															33-50	
Burial 27			7	2	3											4b	9			2
						1	2	3											26-33	
Burial 28																3	3m			
Burial 29		5		9d															33-50	
			[6m													6	4 / 8d	]	33 +	
				4																
		5		7d											7					
		A		A	A	A								A	A	A	A		over 40	
Burial 30			2													2				4
				3	3										3					
Burial 31			[1	2									1	1	2]				18-25	2
			2										1			2				
Burial 32		[2	2	3	2								1	2	3	2	2]		18-25	1
Burial 34		2o																		1
Burial 35															4					
		2		1										2		1	2			

*Mandible fragments belong to the same individual

1-9 Wear of permanent teeth
____ Teeth are insitu or alveolus is present

---- Teeth matched from same location but no alveolus present

[ ] Indicates teeth and alveolus believed to be from said individual.

TABLE 21 (CONT'D)

ADULT MANDIBULAR TEETH

Location	RT	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	LT	Age	Unid.
Burial 38	a	4m	6_	7_															33-50	
	b	_3o_	5_			5d													26-33	2
	c		∠1	3 9											5	1_7			18-25	
	d	8	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	60-70	10
	e														3	2			18-25	
TOTAL TEETH		14	16	17	5	2	1	1	0	0	0	0	3	6	7	13	20	14		32

TOTAL CARIES:

o - Occlusal Carie	=	5	27%	4.2%
m - Meseal Carie	=	4	22%	3.3%
d - Distal Carie	=	6	34%	5.0%
b - Buccal Carie	=	3	17%	2.5%
l - Lingual Carie	=	0	0%	0%
			100%	15.0%

Total # Teeth - 119 = 15%
Total # Caries - 18

*Mandible fragments belong to the same individual

1-9 Wear of permanent teeth
____ Teeth are insitu or alveolus is present

---- Teeth matched from same location but no alveolus present

∠ ̄ 7 Indicates teeth and alveolus believed to be from said individual.

Premolars and Molars - dentine exposed on two cusps.

4. Incisors and Canines - labial and lingual borders become separated, changing the lateral angles to lateral sides.
   Premolars - increased dentine exposure on both cusps.
   Molars - dentine exposed on three cusps.

5. Incisors and Canines - the lingual border develops a smoothly rounded apex leaving only an enamel rim.
   Premolars - buccal and lingual exposure coalesce, usually on meseal side.
   Molars - dentine exposed on four cusps.

6. Incisors and Canines - enamel rim becomes lost lingually.
   Premolars - small island of enamel remains.
   Molars - two exposed cusps coalesce.

7. Incisors and canines - enamel rim completely lost.
   Premolars - only an enamel rim remains.
   Molars - coalescence of an additional exposed cusp.

8. Premolars - enamel rim lost meseally or bucally.
   Molars - small island of enamel remains.

9. Premolars - enamel rim lost completely.
   Molars - rim lost either meseally or bucally.

These stages are illustrated in Figure 10.

All teeth, both in situ and loose, were observed for degree of attrition, but only those that were in situ or appeared to belong to the same individual, as determined by matching wear facets, were placed into age categories. Several individuals could be associated with the same burial. For example, at least three individuals were found in Burial 38 where tooth wear ranged from slight degrees to extensive.

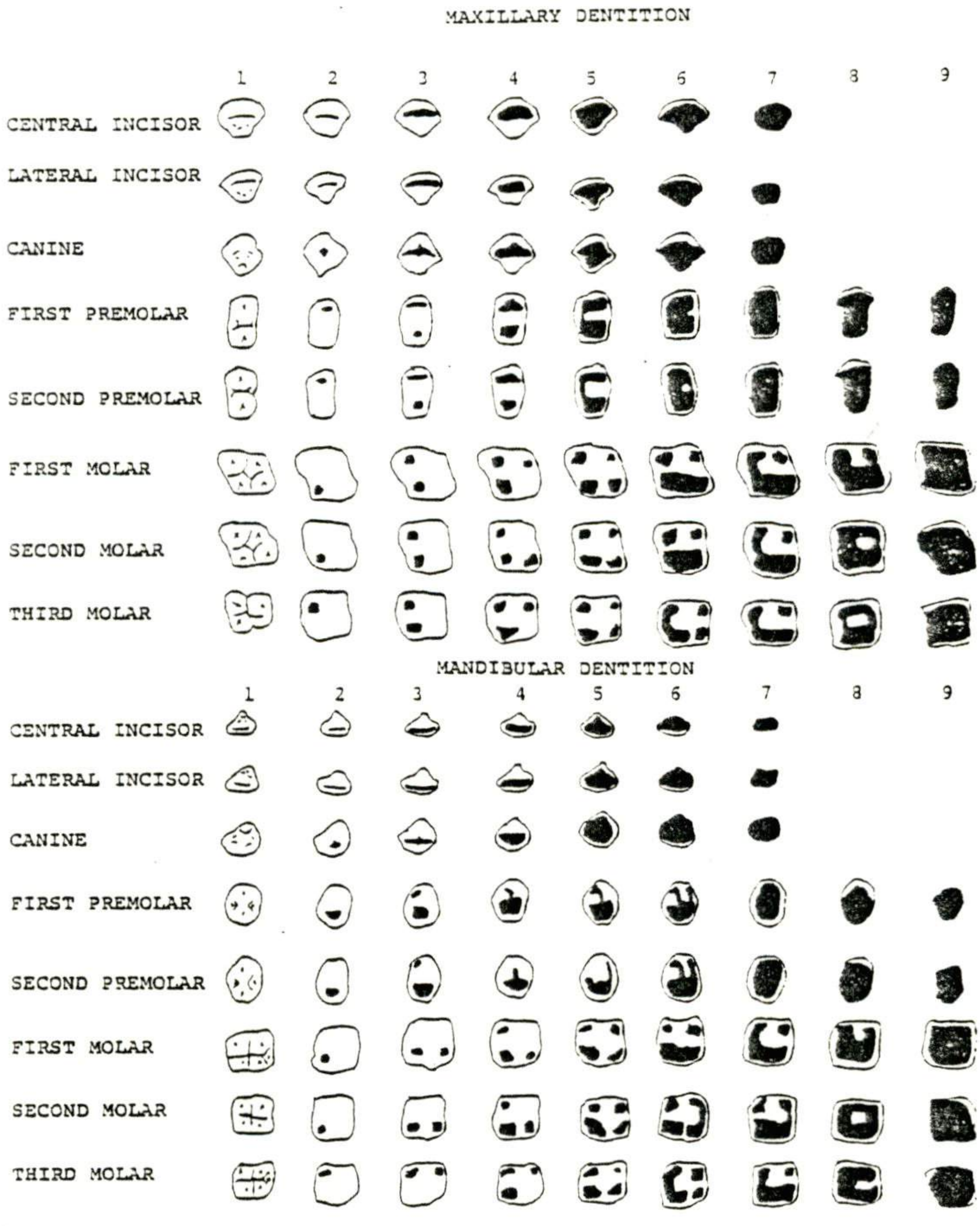


Figure 10.--Stages of dental attrition adapted from Murphy (1959).

The maxillary teeth from Burials 3, 26, 30, and 38b indicate individuals with a high degree of attrition. Medium tooth wear was observed in Burials 6, 9, 24, 27, 38a, and "South's burial". Slight or no dentine exposure was found in Burials 7, 16, 31, 38c and d. The mandibular teeth showed a high degree of wear in Burials 8, 10, 18, 24a, 26, 29, 38a and d, medium wear in Burials 1, 6, 23, 27, and 38, and little or no wear in Burials 24b, 31, 32, 38c and e. Plate 3 shows the mandibles from McFayden that had little or high degrees of attrition and wear. Placing the individuals, represented in these burials, into age categories, according to dental attrition, as devised by Hrdlicka (1939:45) resulted in the following information:

Maxillary Dental Attrition

Right	Left	Minimum # Individuals	Represented	Age
5	5	5	Young Adults	18-25
8	6	8	Adults	26-35
3	4	4	Old Adults	35-over
16	15	17		

Mandibular Dental Attrition

Right	Left	Minimum # Individuals	Represented	Age
3	5	5	Young Adults	18-25
5	3	5	Adults	26-35
7	6	7	Old Adults	35-over
15	14	17		

The minimum number of individuals represented by dental remains was seventeen. This figure was used as 5 left maxillary units of young adults, 8 right maxillary units of adults, and 4 left maxillary units of old adults, could be isolated to depict individuals. Furthermore, there were 17 left maxillary second molars present in the sample, the largest total of single teeth.

In the sample population, the number of individuals placed in each age category, using degrees of attrition, corresponded well to the numbers belonging to each category as determined by suture closure. Figure 11 illustrates this correlation with 6 young adults, 5 adults, and 4 old adults represented using the suture closure method; 5 young adults, 8 adults and 4 old adults represented by maxillary teeth; and 5 young adults, 5 adults, and 7 old adults, derived from mandibular teeth. In five instances, individuals from the same burial were represented in the same age category using the two methods. This suggests that the cranium and dental remains belong to the same individual. Table 22 illustrates all instances of co-occurrence represented by Burials 1, 7, 24, and 38.

To conclude, the maximum number of individuals represented in the McFayden population, derived from combining the results of the suture closure method and dental attrition for aging individuals, is 24. This total includes 6 subadults (15 and under), 6 young adults (15-25), 8 adults (26-40), and 4 old adults (over 40).

Age Determined By Observed Suture Closure

Because of the poor preservation and enormous amount of

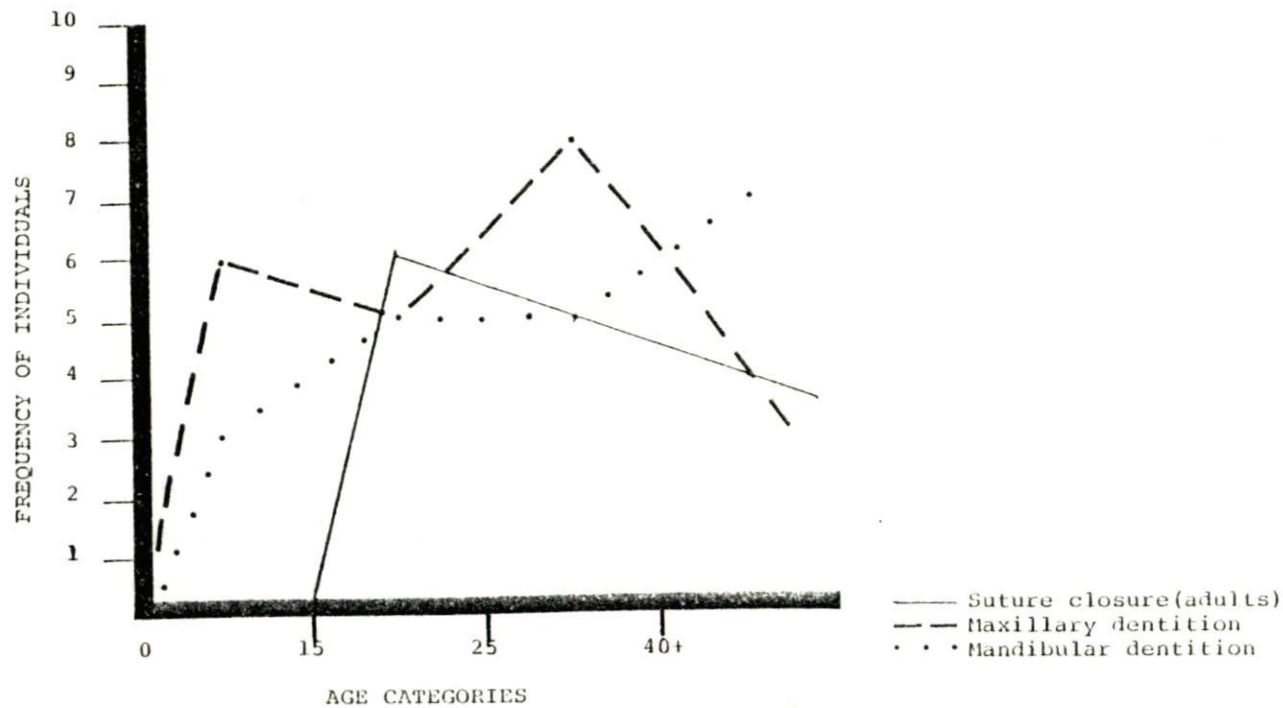


Figure 11.--The frequency of individuals from the McFayden Mound represented in each age category determined by suture closure and dentition.

TABLE 22:

CORRELATION BETWEEN AGE GROUPS DEDUCED
FROM ADULT DENTITION AND SUTURE CLOSURE

Location		Age Suture Closure	Age Dental Attrition	Age Category
*	South's Burial	28-35	26-33	Adult
***	Burial 1	15-27	26-33	Young Adult & Adult
	Burial 4	15-27	33-50	Young Adult & Old Adult
	Burial 6	Over 40	26-33	Adult and Old Adult
**	Burial 7	15-27	15-27	Young Adult
	Burial 8	15-27	35-50	Young Adult & Old Adult
**	Burial 24	Over 40	33-50	Old Adult
**	Burial 38a	25-35	26-33	Adult
***	Burial 38a	25-35	33-50	Adult & Old Adult

* Teeth insitu in Cranium

** Correlation in age suggests same individual

*** Overlap in age, may suggest same individual fragmentation of the cranial remains from the McFayden Mound, only fifteen individuals could be aged by observing suture closures. These individuals were represented by one cranium (skull minus the mandible), three calvariusm (cranium (skull minus the face)(Brothwell 1972:36), and eleven fragmented calvas (calvarium minus the base). Cranial sutures are clearly visible in subadults (individuals under fifteen years old at the time of death), and young adults. In adult life the sutures disappear gradually as the bones of the skull unite, and in old adults many totally disappear.

Studies indicate (Krogman 1978) that the process of suture closure has only a general relationship with age and that one should acknowledge a minimum error of ten years when using the suture closure method. The commencement and progress of suture closure is so erratic that any pattern of the suture process can be seen at any age. Therefore, as direct or supportive evidence for age identification, suture closure is of little use (Krogman 1978:87). However, in this research exercise, where disarticulation of individuals occurs, examining closure provided a useful means for estimating general age groups represented by the sample population.

Two methods for examining suture closure to determine age were used in this study. One method devised by Todd and Lyon involved observing suture closure endocranially and rating closure at particular points along the suture (Todd and Lyon 1924:383). Four points of closure were observed along the coronal suture (pars bregmatica, pars complicata, pars stephanica, and pars pterica), and sagittal suture (pars bregmatica, pars verticis, pars obelica, and pars lambdica), whereas three points of reference occurred on the lambdoid suture (pars lambdica, pars intermedia or media, pars asterica)(Krogman 1978:82). Each point on the suture was ranked ranging from 0 (completely open) to 4 (completely closed), depending on the degree of closure observed.

The second method introduced by McKern and Stewart (1957) used the same format as the first except that the outer or ectocranial surface of the skull was observed. One problem with this technique, which makes its use less favorable, concerns what was referred to as "lapsed union". Lapsed union occurred when ectocranial sutures remained open over a time period where closure normally occurs. What exactly happened in the case of lapsed union was not very clear. The structure of the cranial vault is composed of two bone layers - an inner (tabula interna), and an outer (tabula externa), separated by a vascular space occupied by spongy bone called the diploë. Suture closure begins endocranially, progressing ectocranially, and in many cases closure will be so complete that the outer suture was entirely obliterated. Lapsing takes place when the suture force loses energy, dissipates, and discontinues closing, leaving the outer suture open. Hence, more variability may be found when observing the ectocranial sutures for closure than was found when observations were made endocranially.

It was suggested that whenever possible the endocranial sutures should be examined for closure to determine age at the time of death (Krogman 1978:85-86).

The fifteen individuals represented by the cranial sample were aged using Todd and Lyon's method for examining suture closure. Table 23 illustrates the results.

Six cranial remains of the fifteen individuals displayed very little or no suture closure. This state, according to Todd and Lyon, suggested an age less than twenty-two. These remains included five calvas from Burials 1, 2, 4, 7, and 8 and one calvarium from Burial 5. The calva retrieved from Burial 7 was considerably smaller than the other young adult individuals.

Four adults, between the ages of twenty and thirty-five, were also present in the sample. A calvarium found in Burial 11 had coronal and sagittal sutures that were partially closed, while the lambdoid suture remained open. A calva in Burial 2 exhibited a similar pattern. Two calvas from Feature 5 in the 25L40 trench were also placed in this age category. Calva 38a could be examined at one point along the coronal suture, at all four points of the sagittal suture and two points along the lambdoid suture. All closure appeared to have begun, indicating an age of approximately 26. Calva 38b could only be observed along the right side of the lambdoid suture where it was evident that closure had commenced. This individual was also judged to be around 26 at the time of death.

TABLE 23: DEGREES OF SUTURE CLOSURE AND ESTIMATED AGE

Burial	Square	Feature	Coronal 1	Coronal 2	Coronal 3	Coronal 4	Sagittal 1	Sagittal 2	Sagittal 3	Sagittal 4	Lambdoid 1	Lambdoid 2	Lambdoid 3	Estimated Age
South's Burial*			1	2	2	3	4	4	4	4	4	2	0	28-35-A
1	20L30	1	0	-	-	-	0	0	0	0	0	0	0	Under 22-YA
2a	20L50	1	4	4	-	-	4	4	2	1	1	1	-	20-35-A
2b	20L50	1	-	-	-	-	2	0	0	0	0	0	0	Under 22-YA
4	20L30	2	1	0	-	-	1	0	0	0	-	-	-	Under 22-YA
5	20L50	2	1	-	-	-	0	0	0	0	0	0	0	Under 22-YA
6	20L30	3	4	4	4	-	4	3	-	2	3	2	-	Over 42-OA
7	20L30	3	-	-	-	-	0	0	0	0	0	0	0	Under 22-YA
8	20L50	3	0	0	0	0	0	0	0	0	0	0	0	Under 22-YA
11	25L40	5	1	2	3	3	0	1	0	-	1	0	0	20-30-A
12	25L40	5	4	3	2	2	4	4	4	4	-	-	-	Over 42-OA
13	25L40	6	4	4	4	4	4	4	4	4	4	4	3	Over 42-OA
24	20L40	.0-.3'	4	4	-	-	4	4	4	4	4	4	3	Over 42-OA
38a	25L40	5	1	-	-	-	1	1	1	2	1	1	-	25-35-A
38b	25L40	5	-	-	-	-	-	-	-	-	1	0	0	26-35-A

A Coronal Suture
1=pars bregmatica
2=pars complicata
3=pars stephanica
4=pars pterica

B Sagittal Suture
1=pars bregmatica
2=pars verticis
3=pars obelica
4=pars lambdica

C 1=pars lambdica
2=pars intermedia
3=pars asterica

O = completely open
4 = completely closed
YA = young adult 15-20
A = adult - 20-40
OA = old adult over 40

* Ectocranial suture closure observed

The coronal, sagittal, and lambdoid sutures of four individuals, represented by four calvas (Burials 6, 12, 13, and 24) were almost or completely closed. This amount of closure indicated that these were older individuals, perhaps over forty-five at the time of death. Burials 13 and 14 exhibited complete fusion of the sutures, to such a degree that they were almost absent. The closure of the sutures of two calvas, one from Burial 6 and the other from Burial 12, was not so obscure, possibly suggesting the presence of younger individuals.

The one complete cranium from the McFayden Mound was observed ectocranially for degrees of suture closure. This method was used, as it was impossible to observe the endocranial sutures unless the calvarium or sagittal sections of the cranium were removed. This cranium, labeled "South's burial", exhibited signs of lapsing along the coronal suture where the bone on either side of the suture had piled up giving a "clawed" appearance (Krogman 1978:85). The closure process, therefore, had terminated before this suture was completely united. On the other hand, the sagittal suture was completely closed and nearly obliterated. The lambdoid suture was almost closed along the pars lambdica but open along the pars asterica. The age of this individual was estimated to be 27 to 35 years at the time of death.

In summary, only fifteen individuals from the McFayden sample could be aged using the suture method. Two methods were introduced in the study. One was Todd and Lyon's method for observing suture closure endocranially and the other method was one devised by McKern and Stewart for observing ectocranial closure. The results of this study indicated the presence of six young adults, aged to be less than 20 years old; five adults, aged between 20 and 40, may be represented; and an older population of four individuals with complete suture closure, aged over 40 at the time of death. Figure 12 shows graphically the frequency of individuals for each of these age groups.

Stature

Methods of estimating the stature of living adults using lengths of bones are based on the assumption that height is correlated with the length of long bones. The proportion of long bone length to stature varies considerably between populations, and different formulas have been devised to effectively deal with this variety (Ubelaker 1978: 44). For New World aboriginal skeletons, equations have been computed for estimating the statures of Mongoloid and Mexican populations (Trotter and Gleser 1958:79-123). These equations, however, are derived from measurements taken on whole long bones, and not fragmented long bones such as those present in the McFayden sample. To overcome this dilemma, lengths were estimated from long bone fragments. This method, devised by Steele (1970) for American white and Negro populations, allows measurements of segments of the femur, tibia, and humerus to be computed for the entire bone length. The segments were identified by landmarks characteristic of each bone (Steele 1970:86). For

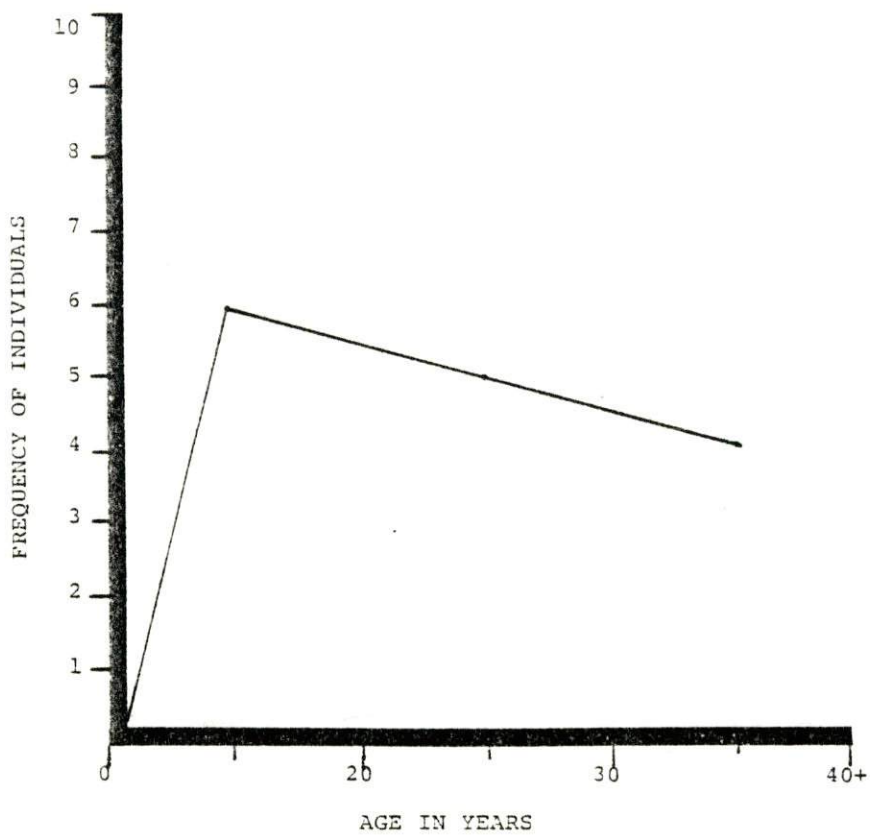


Figure 12.--Age of individuals estimated from suture closure

example, one incomplete femur shaft from McFayden, identified as belonging to a female (circumference = 7.6 centimeters), was estimated to be 25.0 centimeters long for a particular segment. This segment, number 2, was measured using sliding calipers from the midpoint of the lesser trochanter to the most proximal extension of the popliteal surface, i.e., where the medial and lateral lines become parallel (Steele 1970:87-88). Using the equation for white females (Steele 1970:93) and substituting 25.0 centimeters in the formula, one obtained the results: $0.93\ (25.0) + 19.05 = 42.3 \pm 1.03$.

The estimated length of the femur was 42.3 ± 1.03 centimeters. This figure was then used in equation formulae to determine stature in centimeters for Mongoloid and Mexican populations (Trotter and Gleser 1958:120).

Mongoloid: $2.15\ (42.3) + 72.57 = 163.515 \pm 3.80$

Mexican: $2.44\ (42.3) + 58.67 = 161.882 \pm 2.99$

The plus or minus factor at the end of the equations reflected that the proportion of long-bone length to stature varies within a population. The $\pm$ 2.99 attached to the Mexican formula means that only about two-thirds of the population sample would fall within 2.99 centimeters, taller or shorter, of the actual stature. One third of the population then, would fall outside this range (Ubelaker 1978:44). This plus or minus factor was the standard error. The next step after computing the stature was to adjust the standard error. By multiplying the standard error of the femur length ($\pm$1.03) by the first constant in the stature equation for Mexicans

(2.44), and adding the plus or minus factor for this equation (2.99), a correction was made. Hence,

Mongoloid: $2.15\ (1.03) + 3.80 = \pm\ 6.01$

Mexican: $2.44\ (1.03) + 2.99 = \pm\ 5.50$.

The final estimated stature for the female individual represented by the femur was 163.315 ± 6.01 centimeters and 161.882 ± 5.50 centimeters using the Mongoloid and Mexican regression equations respectively.

Both male and female formulas for Negro and white populations were used to determine lengths of 13 humerii, 8 femora, and 8 tibias from the mound. The computed lengths were then incorporated into the regression equation for estimating statures of Mongoloid and Mexican populations. Tables 24, 25, and 26 give the means of these estimates for the three long bones. Since the femora were sexed, the number used in the male and female rows varied.

In these tables, the results were compared with stature estimates of populations from four other Late Woodland and historic sites. In general the stature of the McFayden population ranged from 159.806 centimeters (5'3") to 188.893 centimeters (6'2") using Steele's equation for white males, the regression equation for Mongoloids, and allowing for standard error. For Negro males the same regression equations produced statures ranging from 163.743 centimeters (5'4") to 185.274 centimeters (6'1"). The taller end of the spectrum appeared to be significantly greater than the rest of the populations. This unusual height may be due to the

TABLE 24: STATURE ESTIMATES FROM FEMURS

Mongoloid Formula *

Location	No.	White Male	No.	Negro Male	No.	White Female	No.	Negro Female
$Bw^{O}67$	3	178.993±9.9cm 5'10"±3.9"	3	176.314±8.96cm 5'9"±3.5"	5	162.472±7.1cm 5'4"±2.8"	5	164.474±7.24cm 5'5"±2.85"
$Nh^{V}28$'	3	162.7cm 5'4"			3	157.8cm 5'2"		
$On^{V}305$	4	174.989±9.1cm 5'9"±3.6"	4	177.744±10.1cm 5'10"±3.97"				
$Cd^{O}1$[2]	1	170.7±2.2cm 5'7"						
$Cd^{O}1$	1	168.675±3.8cm 5'6"±1.49"						
$SoC^{V}52^{3}9^{3}$	9	169.604±7.2cm 5'6"±2.8"	9	171.691±7.6cm 5'8"±2.9"	9	165.375±6.8cm 5'5"±2.6"	9	167.105±6.6cm 5'6"±2.6"

Mexican Formula **

Location	No.	White Male	No.	Negro Male	No.	White Female	No.	Negro Female
$Bw^{O}67$	3	179.448±9.9cm 5'11"±3.9"	3	176.407±8.84cm 5'9"±3.48"	5	160.703±6.7cm 5'3"±2.6"	5	162.971±6.89cm 5'4"±2.7"
$Nh^{V}28$[1]	3	158.1cm 5'2"			3	149.4cm 4'9"		
$On^{V}305$	4	175.013±9.1cm 5'9"±3.56"	4	178.03±10.13cm 5'10"±3.99"				
$Cd^{O}1$	1	167.738±2.99cm 5'6"±1.17"						
$SoC^{V}529$[3]	9	164.739±5.69cm 5'5"±2.2"	9	166.509±6cm 5'5"±2.3"	9	163.510±5.2cm 5'4"±2"	9	164.685±5.3cm 5'5"±2.1"

[1]Coe et al 1982, p.65; [2]Stewart 1966, p.74; [3]Trinkley and Hogue 1982, p.14

* 2.15(FEM) + 72.57 = 3.80 (Trotter and Gleser 1958:120)

** 2.44(FEM) + 58.67 = 2.99 (Trotter and Gleser 1968:120)

TABLE 25: STATURE ESTIMATES FROM TIBIAS

Mongoloid Formula*

Location	No.	White Male	Negro Male	White Female	Negro Female
$Bw^{O}67$	8	170.191±7.66 cm 5'7" ± 3.01"	174.834±8.52 cm 5'9" ± 3.35"	166.582±7.11 cm 5'5" ± 2.79"	169.16±8.33 cm 5'6" 3.28"
$Nh^{V}28'$	3	162.8 cm 5'4"	-	157 cm 5'4"	-
$On^{V}305$	-	-	-		-
$Cd^{O}1$	-	-	-	-	-
$SoC^{V}529$[2]	8	166.368±5.2 cm 5'5" ± 2"	168.431±5.6 cm 5'6" ± 2.2"	165.287 ±4.8 cm 5'5" ± 1.8	166.583±4.8 cm 5'5" ± 1.8"

Mexican Formula**

Location	No.	White Male	Negro Male	White Female	Negro Female
$Bw^{O}67$	8	168.253±8.072 cm 5'6"±3.17"	172.832±8.92 cm 5'8" ±3.51"	164.683±7.52 cm 5'5"±2.96"	167.229±8.73cm 5'6"±3.43"
$Nh^{V}28'$	3	159.0 cm 5'3"	-	147.6 cm 4'10"	-
$On^{V}305$	-	-	-	-	-
$Cd^{O}1$	-	-	-	-	-
$SoC^{V}529$[2]	8	168.796±6.9cm 5'6" ± 2.7"	171.161±4.1cm 5'7" ± 1.6"	163.866±6.5cm 5'4" ± 2.5"	165.956±6.2 cm 5'5" ± 2.4"

1 Coe et al 1982, p. 65.

2 Trinkley and Hogue 1982, p. 14.

* 2.39(TIB) + 81.45= ± 3.27 (Trotter and Gleser 1958:120)

** 2.36(TIB) + 80.62= ± 3.74 (Trotter and Gleser 1958:120)

TABLE 26: STATURE ESTIMATES FROM HUMERII

Mongoloid Formula *

Location	No.	White Male	Negro Male	White Female	Negro Female
$Bw^{o}67$	13	168.076±8.3cm 5'6"±3.2"	171.583±7.8cm 5'7"±3.1"	165.894±7.7cm 5'5"±3.05"	164.88±7.3cm 5'5"±2.87"
$Nh^{v}28$	-	-	-	-	-
$On^{v}305$	1	163.63±8.5 5'4"±3.3"	172.763±8.9cm 5'8"±3.5"	163.941±8.2cm 5'4"±3.2"	163.758±7.7cm 5'4"±3.0"
$Cd^{o}1$	-	-	-	-	-
$SoC^{v}529$[1]	7	168.946±8cm 5'6"±3.4"	173.27±8.0cm 5'8"±3.1"	168.099±7.6cm 5'6"±2.9"	166.754±7.1cm 5'5"±2.8"

Mexican Formula **

Location	No.	White Male	Negro Male	White Female	Negro Female
$Bw^{o}67$	13	166.344±8.6cm 5'5"±3.39"	170.249±8.1cm 5'7"±3.2"	164.05±8.1cm 5'4"±3.2"	162.947±7.56cm 5'4"±2.9"
$Nh^{v}28$	-	-	-	-	-
$On^{v}305$	1	161.544±8.88cm 5'4"±3.49"	171.535±9.3cm 5'7"±3.6"	161.922±8.4cm 5'4"±3.33"	161.723±8.1cm 5'4"±3.2"
$Cd^{o}1$	-	-	-	-	-
$SoC^{v}529$[1]	7	167.377±8.4cm 5'6"±3.3"	170.825±8.5cm 5'7"±3.3"	166.453±8.0cm 5'5"±3.1"	164.987±7.5cm 5'5"±2.9"

[1] Trinkley and Hogue 1982, p.14

* 2.68(HUM) + 83.19 = ± 4.25 (Trotter and Gleser 1958:120)

** 2.92(HUM) + 4.24 = ± 4.24 (Trotter and Gleser 1958:120) segment used to determine femur length (number 3 in all cases) which was the most difficult to determine from landmarks. The stature determined for white and Negro females using the formula for Mongoloid population were 157.242 centimeters (5'2") to 173.654 centimeters (5'8") and 157.234 centimeters (5'1") to 177.49 centimeters (5'10") respectively. These estimates compared more favorably with statures recorded for other aboriginal populations. The Mexican regression equation produced stature estimates greater for femurs of males but smaller for females. Stature computed from humerii and tibia using the Mexican formula were shorter overall than the estimates derived from the Mongoloid equation.

When compared with the estimated stature of populations from other sites, the McFayden statures resembled those from Late Woodland populations of $Cd^{o}1$ and $On^{v}305$ and the historic $SoC^{v}529$ population. The sample from $Nh^{v}28$ was somewhat smaller in stature, with the largest height measuring 162.8 centimeters (5'4") for males.

Better results from regression formulae would be obtained when one applies a particular formula devised for a particular population than when another formula was used (Trotter and Gleser 1932:466). The use of Steele's formulae to compute long bone length no doubt increased sample error when applied to the McFayden material. Further complications arise when one uses Trotter and Gleser's regression equations because they were based on measurements taken from male Korean War casualties. The samples used to produce both the Mongoloid (92 males) and Mexican (112 males) equations were relatively small in number and sampling error may be considerable (Trotter and Gleser 1958:114). Additional error was inevitable given the heterogeneity of the Mongoloid sample which includes 23 Japanese, 22 American Indians, 20 Filipinos, 9 Hawaiians, 2 Chinese, 2 Samoans, 1 Malaan, and 13 White-Mongoloid and Mongoloid subgroups (Trotter and Gleser 1958:81). Trotter and Gleser tested their Mongoloid and Mexican regression equations on 8 American Indians and 6 Mexicans from World War II casualties. The results indicated that the Mongoloid formula was accurate for the American Indian population. Both the Mongoloid and Mexican series resulted in stature estimates which were too tall for the Mexican sample, but the Mexican equation was more precise than the Mongoloid equation for stature (Trotter and Gleser 1958:114). It seemed appropriate then to use the Mongoloid regression formula for the McFayden sample even though there may be considerable sampling error in the estimated bone lengths.

Studies have shown that the lower limb bones have lengths that were correlated more highly with stature than upper limb bones (Trotter and Gleser 1958:119-120). Keeping this in mind, stature estimates derived from the femora and tibias in the present sample were probably more accurate than those estimated from humerii.

From the above discussion it was evident that there are many problems associated with stature estimates for fragmented aboriginal long bones. Sampling error must be considered with the use of formulae suitable to other racial groups. This analysis indicated that the sample population from the mound was medium in stature ranging from 162.427 $\pm$ 7.13 centimeters to 178,993 $\pm$ 9.9 centimeters using the Mongoloid regression formula.

Morphology

Georg Neumann has proposed a framework for the reconstructing the racial history of the North American Indian. After studying morphological and morphometrical data from archaeological skeletal remains, Neumann observed that certain characteristics varied between populations. These observations led him to devise categories of American Indian populations which included the Otamid, Iswanid, Ashiwid, Walcolid, Lenapid, Inuid and Deneid, each exhibiting traits significantly different from the others (Neumann 1952:15-31).

Neumann speculated on the possible linguistic affiliations of these physical types. He linked the Archaic Otamid type with the Coastal Algonquian speakers. Other affiliations included Iswanid-Siouan, Walcolid-Muskogian, Lenapid-Algonquian, Deneids-Athabaskans, Inuid-Esquimauan and Lakotid with languages of the Plains (Neumann 1952:34). Of particular interest to the present study were the Iswanid physical type, linked by Neumann to the Siouan linguistic stock, and the Lenapid type, which he connected with the Algonquian stock. Archaeological and ethnohistorical studies (e.g., Mooney 1894:65; Swanton 1946:13; and Phelps 1980:8) suggested that Siouan and Algonquian speakers inhabited the coastal plain area of North Carolina in historic times. Mooney (1894:65) holds that the Cape Fear Indians were Siouan because of their affiliations with known Siouan groups. However absurd it seemed to attach linguistic stocks to prehistoric human skeletal remains it seemed reasonable to compare skeletal remains with Neumann's physical types to assess similarities in and differences between aboriginal populations.

For the purpose of this thesis, the cranial remains from McFayden were compared with Neumann's data on the Iswanid and Lenapid. Other cranial remains from sites in the North Carolina coastal plain and piedmont regions were used for comparative samples, as well as remains from the South Carolina coast. Another comparative sample was from Hrdlicka's (1916:112) collection of Munsee skeletal remains from southeastern Canada to Virginia, which he described as Algonquian. Neumann (1952:24) included Hrdlicka's data in describing his classification of the Lenapids.

The Iswanid variety was defined by the following characteristics. The skull was relatively small with a medium cranial vault that was ovoid in form and had medium muscular relief; small to medium brow ridges; a slight amount of sagittal cresting; medium parietal eminences; slight lambdoid flattening; and a medium to high occiput. The face was gracile, with oblong, often square orbits.

Prognathism was medium to submedium (Neumann 1952:18-19).

The Lenapid physical type was characterized by a relatively large narrow skull. The vault was ovoid to ellipsoid with medium muscularity. Brow ridges, frontal slope, frontal breadth, and parietal eminences are usually large. The face was moderately rugged with rhomboidal orbits and submedium to medium prognathism (Neumann 1952:23-24).

Cranial measurements and indices for Neumann's Iswanid and Lenapid varieties are listed in Tables 27 and 28 along with data from the comparative samples.

Nine crania, 2 males and 7 females, from McFayden could be measured from indices. Because of the fragmented condition of the remains, some of the measurements were estimates. Other populations represented in the comparative sample included 5 crania (2 males and 3 females) from $Nh^{v}28$, an ossuary located in the coastal region in New Hanover County (Plates 4 and 5). The individuals represented in this population resemble the Iswanid physical type (Coe et al. 1982:70). Historic Siouan remains from the piedmont region of North Carolina were also used. These included skeletal remains from a prehistoric site located on the Dan River ($Rk^{v}12$)(Plate 6) and from the historic Siouan villages of Keyawee ($Rd^{v}1$) and Occaneechi ($Or^{v}11$) and Occaneechi ($Or^{v}11$) (Coe et al. 1982:67). Three crania measured by Holmes (1916: 21-22) from the Duplin County Mounds No. 1 and No. 2 were included with their computed indices (Hogue 1977:5).

A second population from a burial mound in Cumberland

TABLE 27: CRANIAL MEASUREMENTS

Population	Burial No.	Sample Size	Sex	Cranial Length MM.	Maximum Breadth MM.	Basion-Bregma Height MM.	Minimum Frontal Breadth MM.	Total Facial Height MM.	Upper Facial Height MM.	Bizygomatic MM.	(Ext) Maxillo-Alveolar Length MM.	(Ext) Maxillo-Alveolar Breadth MM.	Symphaseal Height MM.	Bigonial Diameter MM.
Iawanid[1]		33	M	$\bar{X}$ 177.0	$\bar{X}$ 134.9	$\bar{X}$ 138.8		$\bar{X}$ 118.0	$\bar{X}$ 70.9	$\bar{X}$ 135.9				
Bw°67**		1	F	183.0	139.0	131.0	102.0		67.5	133.5	57.0	60.0		
	4	1	F	170.0*	132.0									
	5	1	F	186.0	135.0*	138.0*								
	6	1	M	177.0	130.0									
	11	1	F	181.0	140.0	132.0*	104.0*							
	12	1	F	180.0*	135.0*		104.0*							
	13	1	F	180.0	130.0*	128.0*								
	24	1	F	181.0	142.0*									
	29		?								1 56*	59*		120±0
	38	1	M	170.0*	130.0*						2 $\bar{X}$ 52.5	$\bar{X}$ 58.0	32.0	100±0
Nh^{v}28[2]**	4	1	F	174.0*										
	6	1	M	180.0	145.0		92.0						31.0*	108.0
	7	1	F	175.5										103.0
	13	1	M	174.5	134.0	138.0							30.0*	
	17	1	F	180.0*	135.0*								31.0*	99.0
Duplin County		1		193.0	151.0	144.0								
Mounds Nos.		1		172.0	133.0	136.0								
1 and 2[3]		1		180.0	137.0	147.0								
So^{c}V529	1	1	M	171.0	144.0*									
	2	1	F											
Rk^{v}12[2]	2	1	F			140.0	95.0	112.0	68.0	130.0*	49.0	60.0	30.0*	87.0
	3	1	F	175.0	134.5	140.0	88.0	112.0	70.0	118.0*	51.0	64.0	32.0	83.0
Or^{v}11[2]	1	1	M	169.5	139.0	134.0	91.0		69.0*	141.0		61.0	33.5	100.0
	4	1	M	168.0	144.0	141.0	97.0	116.0	74.0	135.5*	55.5	65.0	34.0	96.0
Rd^{v}1[2]	4	1	M	183.0	135.0									
	11	1	F	168.0	146.0		94.5							
Cd°1	2981		M	179	136									
	2984		F	176	127									
	9082		F	172	126									
	137		F	172	127									
	220		F	170	130									
	2982		F	172	136									
	2984		F	176	127									
	9082		F	172	126									
	137		F	172	127									
	220		F	170	130									
Lenapid[4]		24	M	$\bar{X}$ 182.5	$\bar{X}$ 137.4	$\bar{X}$ 141.7		$\bar{X}$ 123.1	$\bar{X}$ 75.1	$\bar{X}$ 136.5				
Munsee[5]		9	M	$\bar{X}$ 190.5	$\bar{X}$ 141.0	$\bar{X}$ 139.0	$\bar{X}$ 94.0	$\bar{X}$ 121.5	$\bar{X}$ 71.5	$\bar{X}$ 139.0	$\bar{X}$ 56.0	$\bar{X}$ 68.0	$\bar{X}$ 37.0	$\bar{X}$ 105.0
		6	F	$\bar{X}$ 176.0	$\bar{X}$ 134.0	$\bar{X}$ 129.0	$\bar{X}$ 91.0	$\bar{X}$ 117.0	$\bar{X}$ 69.0	$\bar{X}$ 128.0	$\bar{X}$ 52.5	$\bar{X}$ 63.5	$\bar{X}$ 34.0	$\bar{X}$ 96.0
Onslow County[2]		1	M	196.0	131.0	145.5	94.0	120.0	76.0	134.0*	62.0	67.0	35.0	99.0
Pender County[2]		1	M	180.0	126.0*	131.5*	96.0	129.0*	81.0			65.0*	39.0	100.0

[1] Neumann, 1952, pp. 17-19, 32.

[2] Coe et al. 1982, p. 68.

[3] Holmes, 1916, p. 21-22.

[4] Neumann, 1952, pp. 23, 24, 32.

[5] Hrdlicka, 1916, pp. 23, 26, 31.

[6] Stewart 1966, p. 73.

* Estimated

** Mandibles matched by age and sex

TABLE 28:

MEAN CRANIAL INDICES

Population	Sex	No.	Cranial Index	No.	Cranial Module	No.	Cranial Length Height Index	No.	Cranial Breadth Height Index
Iswanid[1]	M	33	76.25	33	150.23	33	78.27	33	102.89
Bw^{o}67	M	2	74.72*						
	F	7	75.77*	4	150.0*	4	72.74*	4	97.3*
	?	1							
Nh^{v}28[2]	M	2	67.67*	1	148.83	1	79.08	1	102.98
	F	1	75.00*						
Duplin Co.[3]	?	1	78.23	1	162.66	1	74.61	1	95.36
Mounds No.	?	1	77.32	1	147.00	1	79.06	1	102.25
1 and 2	?	1	76.11	1	154.66	1	81.66	1	107.29
Cd^{o}1	M	6	72.8						
	F	5	74.1						
Rk^{v}12[2]	F	1	76.86	1	149.83	1	80.00	1	104.09
Or^{v}11[2]	M	2	83.86	2	149.25	2	81.50	2	97.16
Rd^{v}1[2]	M	1	73.77						
	F	1	86.90						
SoC^{v}529	M	1	84.21						
	F								
Lenapid[4]	M	24	75.39	24	153.50	24	77.76	24	103.65
Munsee[5]	M	4	73.90	7	155.6	4	73.10	4	98.90
	F	5	75.80	9	147.5	5	73.10	5	96.40
Onslow Co.[2]	M	1	66.84	1	157.50	1	74.23	1	111.07
Pender Co.[2]	M	1	70.00	1	145.83*	1	73.06	1	104.37*

1 Neumann, 1952, pp. 17-19, 32.

2 Coe et al, 1982, p. 69.

3 Hogue, 1977, p. 5.

4 Neumann, 1952, pp. 23-24, 37.

5 Hrdlicka, 1916, pp. 21, 22, 26, 31.

* Estimated

TABLE 28 (CONT'D)

MEAN CRANIAL INDICES

Population	Sex	No.	Mean Height Index	No.	Fronto-Parietal Index	No.	Total Facial Index	No.	Upper Facial Index	No.	Maxillo-Alveolar Index
Iswanid'	M	33	89.0			33	87.09	33	52.14		
Bw°67	M	2								2	110.47
	F	7	83.23*	3	74.89*			1	50.56	1	105.26
	?	1									105.35
Nh^{v}28[2]	M	2	89.47								
	F	1									
Duplin Co.[3]	?	1									
Mounds No.	?	1									
1 and 2	?	1									
Cd°1	M	6									
	F	5									
Rk^{v}12[2]	F	1	90.47	1	65.43	2	90.54*	2	55.82*	2	123.97*
Or^{v}11[2]	M	2	88.63	2	66.42	1	86.89*	2	52.19*	1	117.12
Rd^{v}1[2]	M	1									
	F	1		1	64.73						
SoC^{v}529	M	1									110.00
	F			1	72.66						
Lenapid[4]	M	24				24	89.65	24	54.88		
Munsee[5]	M	4				7	87.60	7	51.50	8	120.70
	F	5				4	90.50	5	54.10	5	120.50
Onslow Co.[2]	M	1	88.99	1	71.76	1	89.55*	1	56.72*	1	108.06
Pender Co.[2]	M	1	85.95*	1	76.19*						

1 Neumann, 1952, pp. 17-19, 32.

2 Coe et al, 1982, p. 69.

3 Hogue, 1977, p. 5.

4 Neumann, 1952, pp. 23-24, 37.

5 Hrdlicka, 1916, pp. 21, 22, 26, 31.

* Estimated

PLATE 4: CRANIUM FROM Bw^{o}67 COMPARED WITH CRANIUM FROM Nh^{v}28 (RIGHT).

PLATE 5: CRANIUM FROM Bw^{o}67 COMPARED WITH CRANIUM FROM Nh^{v}28 (RIGHT). TOP VIEW.

County, the McLean Mound ($Cd^{O}1$), was also compared with the McFayden remains. It was possible that these "longheads" (Stewart 1966:74) represented an Ironquian population (or perhaps Algonquian) that moved down from the northern coastal regions of North Carolina and settled along the upper Cape Fear River.

Another comparative sample (possibly Siouan) was from an historic site ($SoC^{V}529$) located along the Waccamaw River in coastal South Carolina (Trinkley and Hogue 1982:15). Plate 7 provides a comparison of McFayden and $SoC^{V}529$ craniums. And finally, two crania, probably of Algonquian stock, from Onslow and Pender Counties (Coe et al. 1982:70) were used in the comparison. Plates 8 and 9 compare a McFayden cranium with one from Onslow County.

The nine crania from McFayden included "South's burial" and remains from Burials 4, 5, 6, 11, 12, 13, 24, and 38. This population fits the descriptions given by Neumann for the Iswanid variety. Overall, the skulls were small with a medium to high vault and medium parietal eminences for the female remains. Little muscle marking was noted, and the brow ridges were small to medium in size. These characteristics and the measurements of the McFayden sample indicated a population morphologically similar to the Iswanid variety and the known historic Siouan populations, rather than the Lenapid variety and the other Algonquians.

Burned Bones

Many of the sand burial mounds in North Carolina

PLATE 6: CRANIUM FROM Bw^{O}67 COMPARED WITH CRANIUM FROM Rk^{V}12 (RIGHT).

PLATE 7: CRANIUM FROM Bw^{O}67 COMPARED WITH CRANIUM FROM SoC^{V}529 (RIGHT).

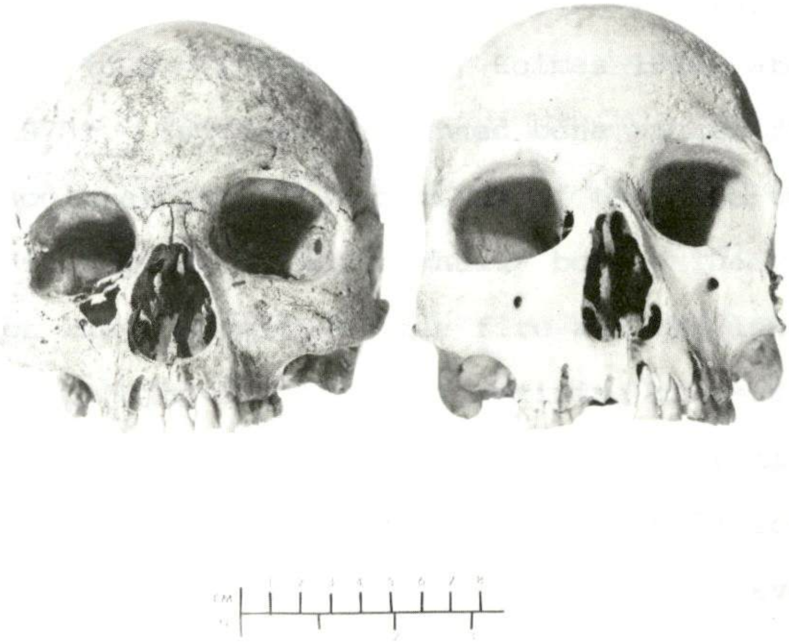


PLATE 8: CRANIUM FROM Bw^{O}67 COMPARED WITH CRANIUM FROM ONSLOW COUNTY. FRONT VIEW.

PLATE 9: CRANIUM FROM Bw^{O}67 COMPARED WITH CRANIUM FROM ONSLOW COUNTY. TOP VIEW.

contain human bones that exhibit signs of being burned and/or cremated (e.g., Peabody 1910; Holmes 1916: Stewart 1966; Wetmore 1978). Evidence of burned bone ranges from a smokey black discoloration on the outside of the bone to a mineral state characterized by white chalky bone. The variability depends on the intensity of the fire and the length of exposure of the bone to the fire. The firing process usually reduces the bone to fragments, and if incineration is nearly complete, the remains are generally too small for preservation and analysis (Ubelaker 1978:33). In the event that the burning takes place somewhere other than the burial mound itself, the fractured bone could blend with the ashes, making it difficult to recognize bones when collecting them for final interment (Stewart 1966:70). Because of the fractured nature of burned bone combined with the high probability of an incomplete sample, it is improbable that a complete skeleton will be present in the burned remains.

According to South's report on the excavations at the McFayden Mound, there was no evidence that burning actually took place on the mound (South 1966). The burned bone samples contained in the excavated portions of the mound were quite small, with the largest sample weighing 8 ounces (Burial 32, Feature 3). The fragments present in each sample were small, making analysis as to age and sex impossible. However, efforts were made to examine the burned bone from McFayden to determine the following: (1) bone identification and location, (2) whether the bone was that of an adult or a subadult, (3) the intensity of the firing process, and (4) whether the bone was exposed to fire in a dry (defleshed) state or green (in-the-flesh) state as indicated by fracture patterns. The sample observed was composed of 138 large cranial fragments and 449 large postcranial fragments. An additional 28.5 ounces of burned fragments too small for analysis were present in the total sample but only recorded for location. Tables 29 and 30 give details of the burned bone analysis.

Identification

Identification of burned remains is a problem because the bones usually are fragmented, distorted, and/or reduced in size by the firing process. Shrinking can occur from 1 to 25 per cent depending on the thickness of the bone, the temperature of the fire, and the duration of exposure during the burning phase. The color of the bone gives some indication of the amount of shrinking (Ubelaker 1978:34).

Despite these difficulties, 138 cranial fragments could be separated from the other burnt bone, and 27 of these could be identified. These items included 3 mandibular fragments, 15 frontal bones (13 are subadult), 5 parietal bones, and 4 temporal bones. The temporal bones included 3 petrous portions, 2 left and 1 right. Of the 449 postcranial fragments, 229 appear to be portions of long bones. Other fragments identified included 4 ribs, 1 pelvis, 8 verbetral, 3 matacarpel, and 2 phalanges.

TABLE 29: BURNED BONE INVENTORY FROM Bw°67

Location	Square	Feature		Number	Blackened On Outside	Blackened Throughout	Blackened Internally, White Outside	Whitened Throughout	Dry	Green	Adult	Sub-Adult
Burial 1	20L30	1	C	4			2	2	1	1	4	
			P	13			13		7	1	13	
Burial 2	20L50	1	C	1	1						1	
			P									
Burial 3	20L30	2	C	4	1	3					4	
			P	2				2	2		2	
Burial 4	20L30	2	C	1				1	1		1	
			P									
Burial 5	20L50	2	C	1				1		1	1	
			P	3				3	1	2	3	
Burial 6&7	20L30	3	C	3			2	1			3	
			P	7			3	4	2	3	7	
Burial 9	25L40	3	C	1				1		1	1	
			P	2				2		2	2	
Burial 10	25L40	4	C									
			P	4	1			3		2	3	1
Burial 13	25L40	6	C									
			P	2				2	2		2	
Burial 14	25L40	6	C	2		1		1			2	
			P									
Burial 16	25L40	8	C									
			P	8			1	7	5	2	5	1
Burial 17	25L40	9	C	2				2		1	2	
			P	2				2	1	1	2	
Burial 18	25L40	10	P	33				31	5	26	30	
Burial 19	25L40	12	C									
			P	2				2		2	2	
Burial 20	25L40	13	C	1		1					1	
			P									
Burial 21	25L40	TopMisc.	C	2		1		1		2	2	
		Bone	P	19	1		1	17	11	5	9	
Burial 22	20L50	.7-.9'	C	10				10		10	10	
		.7-.9'	P	7				5	2	2	3	

TABLE 29 (CONT'D)

BURNED BONE INVENTORY FROM $Bw^{O}67$

Location	Square	Feature		Number	Blackened On Outside	Blackened Throughout	Blackened Internally, White Outside	Whitened Throughout	Dry	Green	Adult	Sub-Adult
Burial 24	20L40	0-.3'	C	2	2						2	
			P									
Burial 25	20L40	.3'-.5'	C	4		2	1	1	3		4	
			P	52	5	2	4	41	34	7	25	
Burial 26	20L40	.5-.8'	C	6			6				6	
			P	2		1	1				2	
Burial 27	20L40	.8-1.3'	C	39	13	9	13	4	8	3	26	13
6 oz.			P	85	18	11	18	38	7	3	50	
Burial 28	40L40	0-.8'	C	1				1	1		1	
			P	3	1			2	2	1	3	
Burial 29	40L40	1	C	5	4	1					5	
			P	3			1	3	2	2	4	
Burial 30	40L40	2	C									
			P	1				1		1	1	
Burial 31	25L47.5	2	C	2				2		2	2	
			P	8		1	1	6	5	2	8	
Burial 32	25L47.5	3	C	5			4	1	1	2	5	
8 oz.			P	64	2			62	42	20	60	
Burial 33	25L47.5	4	C	7			4	3	5	2	7	
4.5 oz.			P	46				46	7	38	40	
Burial 34	25L47.5	5	C	11			3	8		5	11	
7 oz.			P	14			1	13	6	7	14	
Burial 35	25L47.5	6	C	2	1		1		1	2	2	
			P									
Burial 37	25L40	18	C									
3 oz.			P	23		10	8	5	10	5	23	
Burial 38	25L40	5	C	22	3	8		11	6	2	15	
8 oz.			P	44		10	11	23	10	5	40	
		TOTALS	C	138	24	26	36	51	27	34	118	13
			P	442	28	35	63	320	163	138	353	2
				584	53	114	99	371	190	172	471	15

C - Cranial
P - Postcranial

TABLE 30:

BURNED BONE PERCENTAGES

	Blackened On Outside		Blackened Throughout		Blackened Internally White Externally		Whitened Throughout		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Cranial	25	4.3	26	4.4	36	6.1	51	8.8	138	23.6
Postcranial	28	4.8	35	6.0	63	10.8	320	54.8	449	76.4
TOTAL	53	9.1	61	10.4	99	16.9	371	63.6	584	100.0

Adult or Subadult

Once again, the fragmented condition of the burned bone hindered identifying the remains as adult or subadult. Fragment thickness suggested whether an adult or subadult was represented. Four hundred eight-six fragments of the burnt bone, or 83.2 per cent of the sample, could be categorized as either adult or subadult. Using this procedure, 471 (96.9 per cent) of the fragments were classed as adult while 15 (3.1 per cent) were classed as subadult (Table 29). This imbalance may be due to the general delicate nature of subadult bone, which could contribute to greater fragmentation during the burning phase.

Intensity of the Firing Process

During the burning process, the color of the bone changes with increasing temperature. Minimal heat or slight exposure to direct flames causes scorching or smoking, evidenced by blackening, usually on one side of the bone. (Ubelaker 1978:34). It has been suggested that prehistoric cremations reached a temperature of at least 800°C (Stewart 1979:66). With an increase of the temperature above 800°C, the bone becomes calcined, resulting in a color change ranging from bluish-gray to white (Ubelaker 1978:34). The white mineral state is evidence of a very intense fire (Stewart 1966:71).

The cremated remains recovered from McFayden varied in color from black on one side to whitened throughout. From the total sample of 584 fragments, 53 (9.1 per cent) were blackened on one side, 61 (10.4 per cent) blackened throughout, 99 (16.9 per cent) blackened internally but white on the outside, and 371 (63.6 per cent)whitened throughout. The high percentage of whitened fragments is of particular interest because Stewart's analysis of the burned remains from the McLean Mound in Cumberland County, North Carolina, indicates that the majority of the bone fragments from that site also were whitened throughout. Such a state is induced by intense firing and long exposure (Stewart 1966:72).

It has been hypothesized that cranial fragments exhibiting signs of less intense firing (blackened internally/ white on the outside) came from skulls that were no longer intact during the firing process. These skulls could have been defleshed and broken prior to exposure or were flesh-covered and exploded from the heat causing differential exposure to occur (Stewart 1966:71).

Fracture Patterns

When bone is burned, fracture patterns are created on the surface. These patterns provide information on the condition of the bone when it was burned. Burning "dry" bone caused cracking on the surface and regular splitting that was longitudinal. Bone that has been burned in the "green" state was characterized by curved transverse fracture patterns, marked warping, and irregular longitudinal splitting. Thus, by examining fracture patterns on burned skeletal remains, one can determine whether or not the individual was cremated with the flesh removed (Ubelaker 1978:35).

Summary

In summary, 138 cranial and 446 postcranial fragments of burned bone from McFayden were studied to determine type, whether adult or subadult, the intensity of the firing process, and the state of the bone when it was burned. Most of the cranial fragments could not be identified as to bone type. Of the 27 that could, 15 were frontal bones, 5 parietal bones, 4 temperal bones and 3 mandibular bone. Over half of the 446 postcranial fragments appear to be portions of long bones. Other fragments identified include 8 verbebrae, 4 ribs, 3 metacarpels, 2 phalanges, and 1 pelvis. The percentage of adult fragments in the sample was calculated to be 80, while 2.5 per cent were from subadult bones. The intensity of the fire used for burning the remains is believed to have been over 800^{o}C in most cases as 63.6 per cent of the burned bone was in a white mineralized state. The condition of the bone at the time of burning was indicated by fracture patterns. Although not a dependable method for assessing whether or not defleshing had occurred (Stewart 1966:70-71) prior to exposure, observations of 362 fragments suggest that 52.5 per cent of the fragments had been burned defleshed, and that 47.5 per cent had been burned in-the-flesh.

Several speculations could be made to explain this fifty/fifty chance occurrence of "dry" and "green" bone in the mound. One such explanation could be that one sex was cremated in the fleshy state while members of the opposite

sex were defleshed prior to burning. Since burning caused extensive damage to the bone, no assessments of sex could be made for the cremated remains. Perhaps a better explanation would be that at the time of burning, the human remains were in both the fleshy and defleshed states. This theory would be supported by the more recent deaths in the village having little time to decompose prior to burning. Earlier deaths would have little or no flesh left on the individual's bones during the burning process. Evidently the human remains, both in the fleshed and defleshed states, were burned together at one time. This could account for the combination of dry and green bone in the cremation deposits in the mound.

Dental Caries and Subsistence

It is suggested in a number of studies that horticultural populations exhibit a higher percentage of caries and less excessive attrition than pre-horticultural populations (Pfeiffer 1977:37; Larson 1980:192). Larson (1980:192-196) observed that the high sugar component of maize may have caused an increase in dental carie frequency from 9 per cent in the pre-850 BP period to 60 per cent after 850 BP in coastal Georgian aborigine populations (Larson 1980: 192-196).

Dental caries result from a disease process characterized by acids dimineralizing the hard dental tissues (enamel and dentine). These acids are produced by bacterial fermentation of carbohydrates and sugars, such as those found in maize (Larson 1980:193 & 196).

The percentages of caries in the dental remains from the McFayden Mound are listed in Tables 19, 20, and 21. As can be seen, the percentage was small. In subadult teeth, 1 out of 9 diciduous maxillary teeth, or 11 per cent, exhibited an occlusal carie. Two mandibular diciduous teeth out of 12, or 16 per cent, also had occlusal caries. This totaled 3 out of 21 diciduous teeth, or 14 per cent, with occlusal caries. Larson's examination of agricultural populations along the Georgia coast showed that 48.2 per cent (N=56) of the subadult individuals were affected by caries, while preagricultural subadults exhibited no caries.

Cental analysis of 24 Town Creek ($Mg^{V}3$) burials indicated a very high occurrence of caries in 20 of the burials (Graham 1973:98), or 83 per cent of the population sample. The inhabitants of this early sixteenth-century site, located in Montgomery County, North Carolina on the Pee Dee River, were depending upon plant cultivation for over half of their food. Maize agriculture was an important factor in the subsistence of these people (Graham 1973:9). An examination of the adult dental remains from McFayden showed that approximately 12 per cent of the maxillary teeth and 15 per cent of the mandibular teeth were affected by caries. For the adult dentition population as a whole, about 13 per cent, showed evidence of carie with their location breakdown as follows: 3.5 per cent dental occlusal, 3 per cent meseal, 5.5 per cent distal, and 1 per cent on the buccal surface. No caries were observed on the lingual surfaces of the teeth. The calculated frequencies of caries from the Georgia coast using Larson's data was 8.87 per cent for preagricultural and 64.90 per cent for agricultural adults (Larson 1980:197).

The low percentage of caries in the McFayden population, when compared with Larson's data and the analysis from Town Creek, may indicate that maize was not a major food. Further support for the theory that the McFayden inhabitants were non-agricultural is found in the absence of any mention of agricultural foods in ethnohistorical accounts of the Cape Fear Indians. Foods that Hilton (1911:45-50) describes for the Indians he met in his journey along the Cape Fear included fresh fish (mullet, bass, and shad), acorns, and even cattle (Hilton 1911:45-50). No observations of corn, squash, and beans were made. An alternative hypothesis that the mound dates to A.D. 1000, before the introduction of agriculture, seems more likely.

No ethnobotanical remains were found in the mound fill to support or refute either hypothesis, and further research in this area will be necessary before interpretation can be made of the subsistence strategies of these coastal riverine inhabitants.

Tooth attrition would also be affected by environmental inclusions such as sand and grit in food. Stone tools, like the mano and metato used for grinding foods such as corn, could add additional grit to the aboriginal diet. Since there is no evidence for stone grinding tools from the coastal sites, it is assumed that dental attrition observed on the McFayden Mound population was predominately caused by natural wear and incidental inclusions from the immediate environment.

Pathology

The surface of long-buried human bone may exhibit one or more of the following changes: (1) destructive and/or reparative responses to disease during life; (2) deliberate alterations by man either before or after life; and (3) deterioration after death due to acidic soils, earth pressure, animals, roots, etc. (Stewart 1966:76). In general, all types of bone inflammation of whatever nature or however produced are referred to by the term osteitis. If the infection affects only the outer bone, it is known as periostitis. When the inner tissue of the bone is involved, it is called osteomyelitis (Brothwell 1981:128). Sometimes diseases such as yaws can be recognized as the cause for deformity, but in most instances bone deformities are classified as osteitis, periostitus, or osteomyelitis.

Only two post-cranial bones from the mound sample, both from Feature 5 in the 25L40 trench, exhibited signs of osteitis. The left ulna of a young adult showed evidence of infection and bone deformation due to trauma. Plate 10 compares this deformed ulna with a normal adult ulna from McFayden. Note the sinus formations at the proximal end of the infected ulna, which are not present on the healthy ulna.

PLATE 10: ULNA FROM BURIAL 38 (TOP)WITH OSTEITIS
AND NORMAL ULNA FROM BURIAL 3 (BOTTOM).

PLATE 11: RIGHT INNOMINATE FRAGMENT FROM
BURIAL 38 WITH OSTEITIS ON AURICULAR
AREA.

A right innominate fragment belonging to a female individual also exhibited signs of osteitis on the auricular surface. This infected fragment is shown in Plate 11. The sinuses penetrating the bone of the auricular area indicated trauma. A similar infection was seen in a sacrum from a Late Saxon burial and was associated with a puraperal infection (Sandison and Wells 1967:508).

Fractures, especially those of the green stick variety, cannot always be recognized in skeletal remains that are very fragmented (Stewart 1966:79). None was observed in the McFayden sample, but the poor condition of the bone may have been responsible for this absence.

In cranial remains, aside from the dental caries discussed earlier, dental hypoplasia was evident in three adult mandibles. Enamel hypoplasia is not yet fully understood but generally it is thought to be caused by diseases affecting the teeth during their development. Hypoplasia usually appears as irregular ridges and pits in the tooth enamel, and as bands of discoloration. On any tooth, several of these lines may appear, often merging into one another. It is impossible to determine the exact age at which each line was produced, but the overall size of the affected area gives a measure of the length of illness during childhood (Wells 1967:398).

To determine the age of an individual when affected by dental hypoplasia, it is best to observe the enamel on the canine and third molar. The canine is ideal for age assessment, as development begins at the fourth or fifth month and terminates around age six or seven. The third molar, on the other hand, begins developing at eight to nine years and is completely formed around age thirteen (Wells 1967:398). Together, these two teeth give a thirteen-year range for which the age and time of illness can be estimated.

The three individuals represented by mandibles with dental hypoplasia are all aged 26 to 33 at the time of death. This assessment was made by observing degrees of dental attrition. Two of the mandibles belonged to males (Burials 1 and 27) and one was a female (Burial 23). The second right premolar from Burial 1 (male) exhibited dental hypoplasia, indicating a childhood trauma around age four to six. The mandible from Burial 23 (female) showed a similar age range for the hypoplasia on the second premolar; however, the left canine indicates a span of illness from age three to six. The third mandible, a male, has the right canine in situ with hypoplasia markings indicating traumas from ages three to six (Plate 12).

Using enamel hypoplasia to assess the age of an individual when affected by disease has not been tested for accuracy. Given the plus or minus factors computed by Ubelaker (1978:112-113) for ages derived from dental development for American Indians, assessment using hypoplasia marking could be off by as much as three years. For these reasons it was difficult to say whether the presence of

PLATE 12: MANDIBLE FROM BURIAL 27 WITH ENAMEL HYPOPLASIA ON THE CANINE.

similar degrees of enamel hypoplasia in the three mandibles from McFayden represents an epidemic in the village, whether this coincidental pattern indicates three separate times when the individuals were affected.

In summary, there was little evidence of pathology in the McFayden skeletal remains. Only two postcranial bones showed evidence for infectious traumas. These included a left ulna belonging to a young adult and a right female innominate fragment, both from Feature 5 in the 25L40 trench. The presence of similar patterns of enamel hypoplasia on three mandibles, representing individuals aged between 26 and 33 at death, could indicate the possibility of an epidemic in the village during their childhood. This, however, was merely speculation based on a method that has not been tested for accuracy.

Reconstruction of Demographic Profiles and Population Size

The skeletal remains retrieved from the McFayden Mound do not represent all the individuals who died during what could have been a culturally prescribed period. Though incomplete, the sample will be used to attempt to reconstruct demographic profiles for the population. Three assumptions are associated with reconstruction procedures: (1) the sample is a good representation of the population; (2) the ages at the time of death can be accurately determined; and (3) the size of the living population (represented by the mound interments) and their death rates remained constant (Ubelaker 1974:59). As the center of the mound produced the bulk of the skeletal material and appears to have been the focus of the pattern of burial, these three assumptions are considered to be applicable to this investigation.

In this study, the ages at death of the McFayden individuals were used to construct mortality curves, survivorship curves, and life tables for the whole population. These staistics offered important demographic data on longivity, age-specific mortality, and life expectancy for all ages (Ubelaker 1974:59). From this demographic data, crude mortality rates were calculated and population size was constructed.

Table 31 shows the frequency of deaths, by 10-year intervals, of the sample population. Although five-year intervals are more reliable for demographic analyses (Ubelaker 1974:62), ten-year intervals were used in aging the mound population at death. The poor condition of the human bone restricted age determination by methods involving dental attrition for adults. Only a little over one-half of the 41 total number of individuals represented in the skeletal sample can be used for demographic studies. These consist of 6 subadults (individuals under 15 years old) and 17 adults.

Mortality Curves

Figure 13 coverts the percentages contained in Table 31 to a mortality curve for the "living population"

TABLE 31:

FREQUENCY OF DEATHS BY 10 YEAR INTERVALS

Age Interval	Frequency Of Individuals	Percentage Of Total Population
0 - 9.9	5	21.74
10 - 19.9	6	26.09
20 - 29.9	8	34.78
30 - 39.9	3	13.04
40 and over	1	4.35
TOTALS	23	100.00%

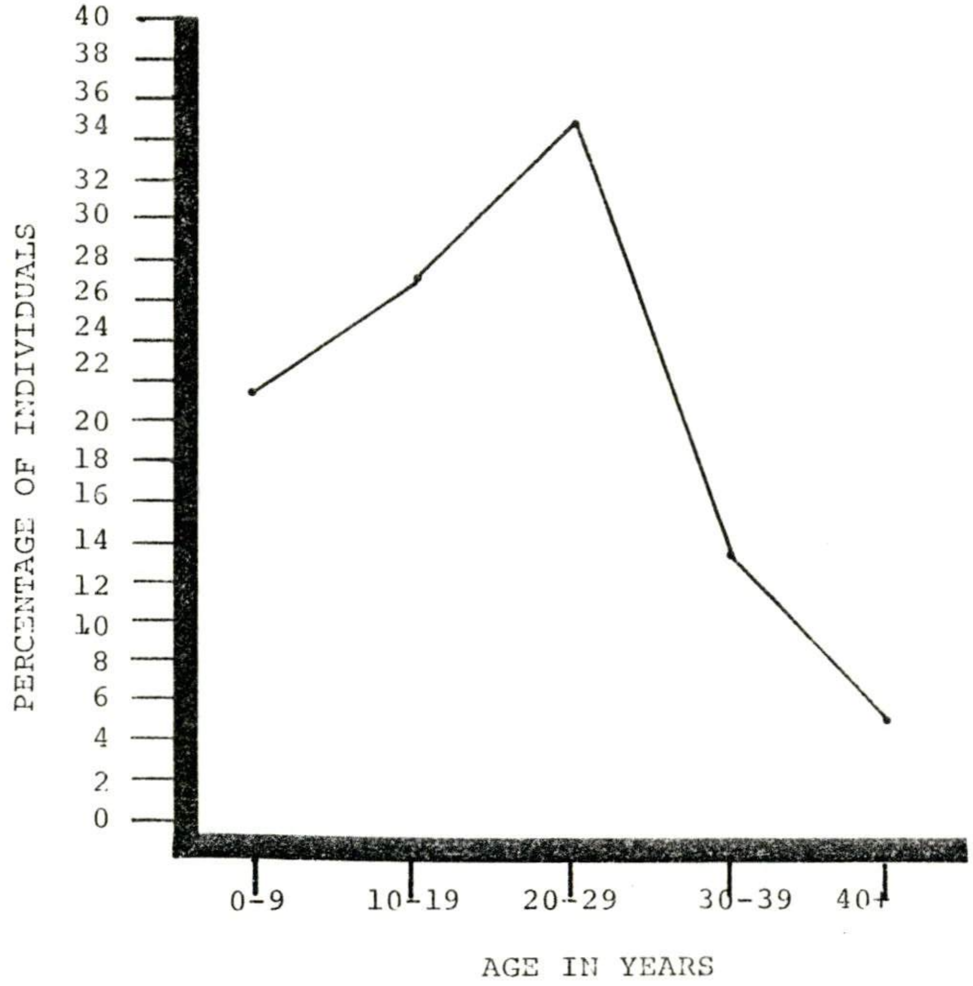


Figure 13.--Mortality curve for the McFayden Mound

represented by the mound sample. One interesting observation is that the highest percentage of deaths occurred in the age interval 20 to 29. In most prehistoric reconstructions, the highest death rate was usually found in one of the lower age intervals, where infant mortality is reflected (Ubelaker 1974:61). That the skeletal sample from McFayden was biased in its representation of subadults was probably the result of a higher percentage of small-bone loss prior to interment. Another reason for the greater number of deaths between ages 20 and 29 could be the result of problems related to childbirth in mature females. Beyond this interval, the percentage of deaths declined at a normal rate with an increase in age.

Survivorship Curves

A survivorship curve is simply the reverse of the mortality curve and plots the percentage of the population surviving after each 10 year interval (Figure 14). For example, the curve showed that 52.17 per cent of all the individuals born in the McFayden population were alive after 20 years, whereas after 30 years only 17.30 per cent were still alive. The number of individuals living after 40 years declined sharply to 4.35 per cent.

Life Tables

The most informative statistical presentation of demographic data is the life table. In forming a life table, several attributes that characterize the demographic

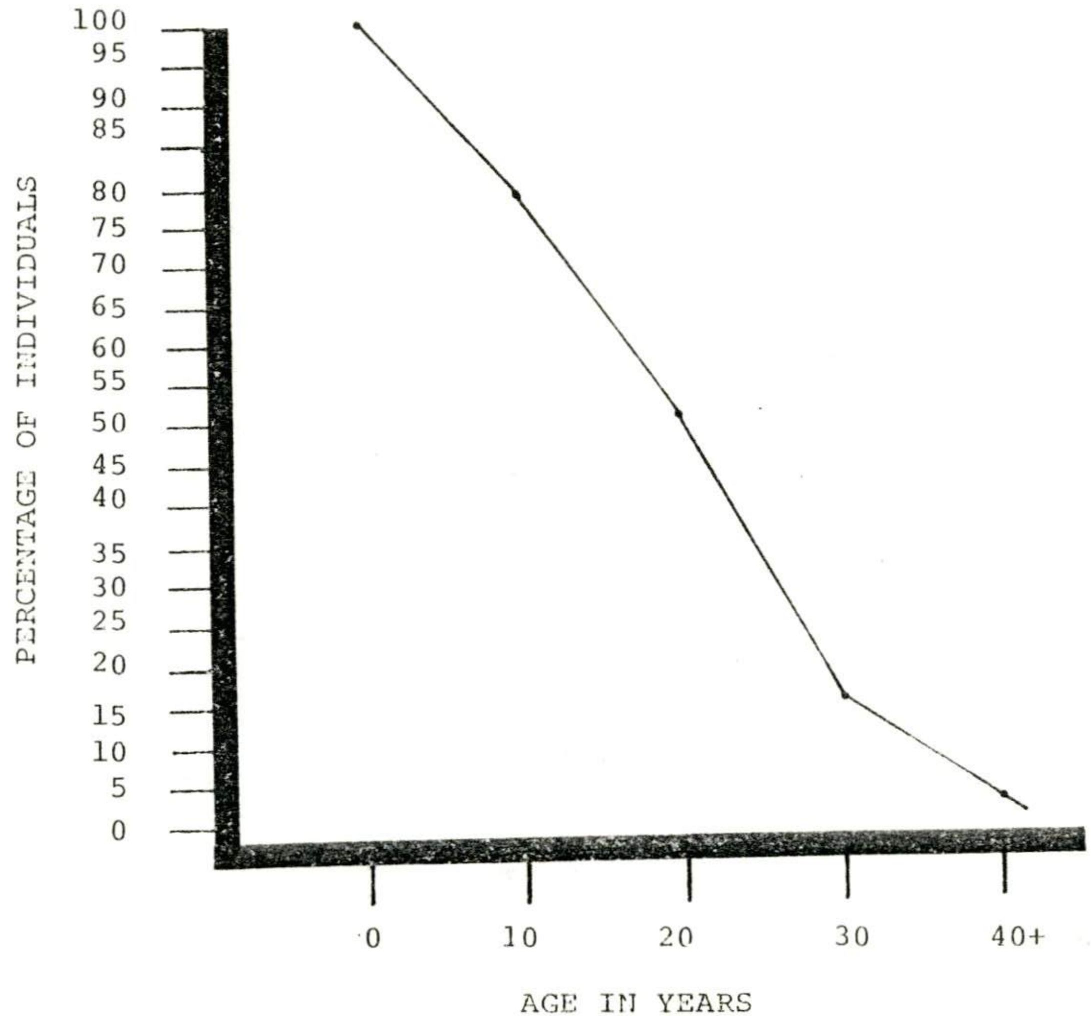


Figure 14.--Survivorship curve for the McFayden Mound

structure of the living population are compared with data taken from both prehistoric and living populations (Ubelaker 1974:61). The table contains calculations for X, the age interval; Dx, the total number of deaths per interval; dx, the percentage of deaths for each age interval; lx, the number of survivors in each interval; qx, the probability of death for each age interval; Lx, the total number of years lived between one age interval and the following age interval; Tx, the total number of years lived after a lifetime for all individuals who reach an age interval; and $e^{o}x$, the life expectancy of an individual at any given age interval (Ubelaker 1974:61).

The life table reconstructed for the McFayden population is given in Table 32. Calculations to determine each column were made using the same methods devised by Ubelaker in his analysis of the Nanjemoy Ossuaries in Maryland (Ubelaker 1974:62). The number of survivors (lx) was obtained by subtracting the percentage of deaths (dx) from the number of survivors entering the interval, beginning with 100 per cent at age zero. Thus, for the age interval 0 to 10, 100 per cent minus 21.74 per cent equals 78.26 per cent survivorship. The figures in the lx column directly correspond to the mortality curve in Figure 13. The probability of death, qx, was computed by dividing dx by lx. The quotient represents the probability of death for the individual in each age category and provides an index of age-specific mortality for the population (Ubelaker 1974:63).

TABLE 32:

LIFE TABLE RECONSTRUCTED FOR $Bw^{O}67$ POPULATION

(x) Age Interval	No. Deaths (Dx)	% Deaths (dx)	Survivors (1x)	Prob. of Death (qx)	Total No. Yrs. Between x and x+10 (Lx)	Total No. Yrs. Lived After Lifetime (Tx)	Life Expectancy ($e^{o}x$)
0	0	0	100	.0000	891.30	1994.7	19.95
10	5	21.74	78.26	.2174	652.15	1103.4	14.10
20	6	26.09	52.17	.3333	347.80	478.25	9.19
30	8	34.78	17.39	.6666	108.70	130.45	7.50
40	3	13.04	4.35	.7498	21.75	21.75	5.00
+	1	4.35	0	1.0000	0.00	0.00	0.00

The value of Lx, or the total number of years lived between X and X+10, was determined by the formula

$$Lx = \frac{10(lx+10)}{2},$$

where l_o is the number of survivors in the age interval following lx. To illustrate how this formula works for the age interval 10 to 20, Lx equals $\frac{10(52.17 + 17.39)}{10} = 10(69.59) =$ 347.80.

The value Tx was derived from the Lx value using the formula

$$Tx = \sum_{x}^{w-1} Lx.$$

The value Tx expresses the total number of years that can be lived by the survivors of each interval (Ubelaker 1974:63).

The life expectancy, or e^ox, for each age interval was determined by dividing Tx, the total number of years lived, by lx, the percentage of survivors (Ubelaker 1974:63). The life expectancy at birth for any individual in the McFayden population was computed as 19.95 years.

Table 33 lists life expectancy figures for several populations around the world. Because of sampling error of each population and the differences in aging methods used to compute life expectancy, these comparisons are of questionable value. There was some question concerning the completeness and reliability of the samples from Pecos Pueblo, Indian Knoll, and Nubia (Ubelaker 1974:64), but aside from these discrepancies, the life expectancy at McFayden was close to the life expectancy at the Nanjemoy Ossuaries in

TABLE 33:

LIFE EXPECTANCY AT BIRTH IN 17 WORLD-WIDE POPULATIONS

Population	Dates	Life Expectancy In Years
Larson, South Dakota	A.D. 1750-1785	13.2
Indian Knoll, Kentucky	3000 B.C.	18.6
Nubia, Egypt	A.D. 1050-1600	19.2
Bw°67, North Carolina	A.D. 1000-1500	19.9
Nanjemoy, Ossuary I, Maryland	A.D. 1500-1600	20.9
Nanjomey, Ossuary II Maryland	A.D. 1500-1600	22.9
Ancient Greeks	670 B.C.-A.D. 600	23.0
Texas Indians	A.D. 850-1700	30.5
European Ruling Families	A.D. 1480-1579	33.7
U.S. Caucasian	A.D. 1800	30.0-35.0
U.S. Negro	A.D. 1900	33.8
English	A.D. 1000-1100	35.3
India (females)	A.D. 1951-1960	40.6
India (males)	A.D. 1951-1960	41.9
Pecos Pueblo	A.D. 800-1700	42.9
England and Wales (males)	A.D. 1965-1967	68.7
England and Wales (females)	A.D. 1965-1967	74.9

Modified from Owsley and Bass (1979:150).

Maryland, and substantially lower than most other populations.

Data on life expectancy and age specific mortality provided a basis for evaluating the health and fitness of a population. Given the discrepancies in aging techniques for each population, it was suggested that comparison of life tables will be of little value until more methods of aging individuals at death can be applied to complete samples of carefully excavated skeletal remains (Ubelaker 1974:64).

Crude Mortality Rates

A statistic that is vital for the reconstruction of populations, is the crude mortality rate. This rate expresses the number of individuals per thousand that die within a year. The figure is a direct reflection of overall life expectancy and is useful evidence of population decline, equilibrium, or expansion (Ubelaker 1974:65).

By assuming that the rate of death was constant in any given population, one can estimate a crude mortality rate by using the formula $M = \frac{1}{e^o}$, where M is the crude mortality rate and e^o is the life expectancy at birth (Ubelaker 1974:65). Application of this formula to the McFayden population produced a crude mortality rate of 50.12 individuals per thousand per year. Comparing this figure with other prehistoric populations (Table 34) indicated that the crude mortality rate of the McFayden population was lower than prehistoric populations from Kentucky and South Dakota, but higher than the populations represented in the Nanjemoy Ossuaries in Maryland. Again these comparisons

TABLE 34:

CRUDE DEATH RATES OF NORTH AMERICAN PREHISTORIC POPULATIONS

Site	Location	Death Rate
Nanjemoy, Ossuary I	Maryland	44
Nanjemoy, Ossuary II	Maryland	48
McFayden	North Carolina	50
Sully	South Dakota	54
Indian Knoll	Kentucky	59
Leavenworth	South Dakota	63
Larson	South Dakota	76

Modified from Owsley and Bass (1979:150).

are of limited value, as different methods of age assessment and varying sample sizes may create considerable sampling error.

Population Reconstruction

With the crude mortality rate estimation, the population size is reconstructed using the formula $P = \frac{1000N}{MT}$ where P is the population size, N is the sample size, and M is the crude mortality rate. The value T represents the number of years represented by the burials in the mound (Ubelaker 1974:66). For the McFayden population, T cannot be accurately assessed. Therefore, calculations of P were made by substituting 6 months to 15 years for the value T. Table 35 gives the reconstructed population sizes for the McFayden Mound with T ranging from 6 months to 15 years and N equaling 23 individuals and 47 individuals.

According to Ubelaker, the number of individuals represented by disarticulated skeletal remains increased as the time between interments increases (Ubelaker 1974:66). As no articulated units were present in the McFayden sample, it is possible that deposition of the remains occurred after at least one or two years had elapsed. Mooney (1894:6) speculates that the population size of the Cape Fear River Indians to be a thousand in 1600. If this figure is correct, the five villages recorded in 1716 (Milling 1940:222) would have contained approximately 220 inhabitants apiece. If N in Table 35 is 47 individuals, then

TABLE 35:

POPULATION RECONSTRUCTION OF Bw°67 WITH N=23 and N=47

Time in Years of Death Represented By Mound Interments (T)	Population Size Reconstructed With N=23 (P)	Population Size Reconstructed With N=47 (P)
.5	918	1875
1.0	459	938
2.0	229	469
3.0	153	313
4.0	115	234
5.0	92	187
6.0	76	156
7.0	66	134
8.0	57	117
9.0	51	104
10.0	46	94
15.0	31	62

deposition may have occurred every four to five years using the information provided by Mooney and Milling.

Needless to say, there is a high probability for sampling error in the demographic profiles for the McFayden population. First, the mound was only partially excavated, limiting the number of individuals used in the study. Second, as discussed earlier, smaller bones such as those belonging to subadults, have a greater tendency at be lost before, during, and after interment. Also, the Cape Fear Indians may not have used the mounds which would invalidate inferences made from the ethnohistorical data. Finally, poor preservation of the skeletal remains retrieved from the mound restricted the methods used for age assessment to the least accurate techniques. These included the degree of dental attrition observed in adult maxillary teeth and calcification and eruption of subadult mandibular teeth. Both techniques required the use of large age intervals for reconstructing the life tables, which were less reliable for demographic analyses.

CHAPTER VI

SUMMARY AND DISCUSSION

Problems abound in the study of sand burial mounds and the inhabitants of the Cape Fear area of the coastal plain. In general, demographic profiles represented by the skeletal remains from almost all excavated sites in the coastal plain have been ignored. Few systematic studies, other than the descriptions of the archaeology and skeletal morphology, exist. As such, comparisons with other prehistoric populations from the area could not be attempted, as the relevant information was not available. In addition, the analysis of the McFayden materials suffers from problems inherent in reconstructing demographic profiles using data from secondary burials. Also, the destruction of portions of the mound biases any attempted reconstruction. And, the archaeology associated with the McFayden excavation has proved deficient. Records beyond the catalog and actual specimens were almost non-existent, and the processing of the skeletal material was inadequate.

These problems aside, one of the more vexing archaeological questions was the actual date of the mound. Two dates have been proposed for the mound. A late Middle-early Late Woodland (A.D. 800-1000) date can be postulated from the presence of an Adam'sCreek pottery sherd in the burial fill. This pottery, with sandy temper and a fine fabric-impressed surface threatment, was believed to have been in use beginning in the late Middle Woodland period (Anderson and Trinkley 1981:5). Other supportive evidence for this date was inferred from the low occurrence of dental caries in the majority of the dental remains. Large quantities of caries have been observed to be associated with agricultural populations especially when maize was grown (Larson 1980). If the McFayden population was preagricultural, the mound could date no earlier than A. D. 1000.

A later time range, A. D. 1400-1600, was suggested by South and was based on a stone pipe fragment found in the mound fill. Similar pipe has been found at sites of the Sara Indians, known Siouans, who were situated along the Dan River about A. D. 1500 (South 1962:23). The pipe described by South, however, also can be compared with Uhwarie style pipes from the piedmont region that date to the early Late Woodland period, A. D. 1300 (Jack Wilson personal communication). Also, Adam's Creek pottery continued to be used in Late Woodland times along the coast (Anderson and Trinkley 1981:5).

This later date can be further supported by the absence of any reference to agriculture by Europeans traveling along the lower Cape Fear River in the 1600s. John Hilton's accounts suggested use of mostly riverine resources and acorns for subsistence purposes (Hilton 1911: 45-50). This would presuppose that the Cape Fear Indians were non-agricultural, which would also account for the lack of dental caries.

As a result of those data, the mound can be dated to somewhere between A. D. 1000 and A. D. 1600. This broad range was only one of the problems associated with the archaeology of the sand burial mounds and the Cape Fear Indians in general.

What is known is that the procedure for constructing a burial mound began by the placing of the remains of individuals on a chosen piece of ground and covering those remains with sand. Additional skeletal remains were brought at various times to the same area and covered, until a substantial mound was raised. Cremations also were interred at various times. In the case of McFayden, some cremated bones were piled on the mound and covered, while others were placed in pits dug into the mound (South 1962:26).

The McFayden Mound burial complex is marked by a pattern of compound disposals. A compound disposal involves at least two processes: (1) the final elimination, and a prior reduction process or processes to remove the flesh by either (a) burial and disinterment, (b) exposure to air, (c) exposure to animals, (d) mechanical defleshing, (e) cremation, or (f) decomposition with chemicals (Sprague 1968:480).

An examination of the skeletal remains from McFayden suggests that at least two procedures for reduction were employed. A total of 584 skull fragments exhibited signs of exposure to direct flames or intense heat. These fragments range in condition from black on the outside, indicating direct contact with flames, to a white mineral state induced by long exposure to intense heat (Ubelaker 1978:34). One can infer from the condition of these fragments that crematory practics occurred as a reduction process prior to burial.

The disarticulation of the remaining cranial and post-cranial material indicated that at least one other reduction process was utilized for the majority of the remains prior to interment. The process(es) used at McFayden to fulfill the reduction stage cannot as yet be determined, although they may have been similar to two means of reduction known to have occurred in nearby areas of the coastal region. The Santee Indians, a Siouan tribe that inhabited areas along the Santee River in South Carolina, lived approximately 130 miles south of the Cape Fear Indians (S.C. Records, B.P.R.O., VII 239, cited by Milling 1940: 222). Their process of reduction entailed exposing the corpse to the sun for one or two days before covering it with cypress bark. As soon as the corpse was sufficiently decomposed, the flesh was removed from the bones and then burned (Lawson 1967:28).

Unlike the Cape Fear Indians, the Santee did not use sand burial mounds for the final deposition of the bones.

Instead, they treated the cleaned bone with oil and stored them in wooden boxes kept by the family (Lawson 1967:28).

The Algonquian peoples, inhabiting areas north of the Neuse River, also practiced a method of compound disposal. The corpse was placed in a charnal house or scaffold where the body was allowed to decompose. The flesh was removed and placed in matts while the bones, after drying, were wrapped in deer skins (Lawson 1967:186). Elimination of the skeletal material followed the reduction process. The remains may have been kept only briefly, or for several years, by the coastal aboriginal populations.

Disposal of the remains occurred in one of three ways: (1) inhumation; (2) aquatic disposal; or (3) surface disposal (Sprague 1968:480). Inhumation is defined as the concealment of the body in a subterranean manner or within a mound above the ground (Sprague 1968:480). The only one of these methods available for direct study by the archaeologist is inhumation. For coastal populations, two outstanding methods of inhumation are relevant to this discussion, burial mounds and ossuaries. The latter involves the placing of previously reduced (defleshed) skeletal material in a mass grave, usually a deep circular pit. The Algonquian Indians, mentioned by Lawson above, practiced this type of interment.

Stanley South, who supervised the excavation of the McFayden Mound, did not observe any primary or bundle burials within the mound. It follows, then, that the McFayden

Mound represented a pattern of burial involving secondary disposal by inhumation, following one or more reduction processes. One of these reduction procedures was cremation.

In secondary burials, certain smaller bones, such as tarsals, carpals, metatarsals, metacarpals, phalanges, vertebrae, and ribs, are likely to be absent. The loss of these remains probably can be attributed to one or more of the following: (1) the initial decomposition process; (2) movement of the bones from the place of initial decomposition to an area designated for final interment; (3) scavenging by animals; (4) aboriginal selection of skeletal remains to be interred; and (5) lack of recovery during excavation (Ubelaker 1974:33). When combined with the dispersed pattern of bone placement and the loss of major larger bones through many of these same processes, the result is an incomplete record of the individuals represented. This causes a great deal of difficulty in reconstructing the demographic qualities of a population represented archaeologically by secondary burials. With these problems in mind, the various characteristics of the archaeological remains and the reconstructed population demography will not be discussed.

The number of indivduals present in the excavated portion of the mound was assessed using a bone-by-bone inventory. This inventory revealed 41 adults through a count of 41 right temporals and 6 subadults using dental remains. Distribution of the skeletal remains within the mound gave some insights into patterns of disposal. The largest feature excavated (Feature 5 in the 25L40 trench) was situated at the center of the mound. It is possible that it represents the initial, primary interment with other remains being added later. Skulls were the most prevalent type of bone, followed by long bones. Most bones were found in the central portion of the mound, and they decreased in frequency as one moved towards the periphery. Cremated bones were concentrated to the west of the mound's center (L45 line), whereas other secondary deposits (not cremated) were located along this line and to the east. Adults, subadults, and cremations all were included in the burials placed in the center of the mound. After the center, the north and east sections of the mound seem to have been preferred for the placement of adult remains. The south and west areas apparently were the second choices for the deposition of subadults and cremations. Comparison of these distributions with those of the other excavated sand burial mounds was not impossible because specific spatial information is not available for most of them.

There are further problems in analyzing the skeletal material. The aging of individuals at the time of death was difficult in the absence of a complete in situ skeleton. Suture closure, dental development and attrition, changes in the os pubis, epiphesial closures, and degenerative changes are all indicators of age. Only rarely can two or more of these methods be combined when analyzing secondary burial remains.

The poor condition of the skeletal remains from McFayden limited aging of subadults to an analysis of dental calcification and eruption, and of adults to dental attrition and suture closure. Using Ubelaker's chart for dental calcification and eruption (1978:112-113) the subadults were aged as follows: 2 individuals 4 years ± 12 months; 3 individuals 6 years ± 24 months; and 1 individual 15 years ± 36 months. This procedure was probably best for aging the subadult segment of the McFayden population.

Unfortunately, the only two methods that could be used to age a significant number of the adults at death were the least reliable. These include dental attrition and suture closure. Seventeen adults could be aged using dental attrition. Attrition on maxillary teeth indicated 5 young adults aged 18-25, 8 adults aged 26-35, and 4 old adults over 35 years. By examining suture closure, age was determined for 15 adult individuals. Six individuals appeared to be young adults, 5 old adults, and 4 old adults. When the two methods were combined for both adults and subadults, 24 individuals were placed in age categories. These were 6 (25 per cent) subadults (15 years and under), 6 (25 per cent) young adults (15-25 years), 8 (33 per cent) adults (26-40), and 4 (17 per cent) old adults (over 40 years).

As for sexing skeletal remains from secondary burial complexes, again a very difficult problem was created for the researcher as there was little chance that an entire skeleton will be retrieved. The sexing of unknown skeletal remains depends on the relative completeness of the skeleton. For adult remains, the entire skeleton can be sexed with 100 per cent accuracy. The percentage of accuracy is lessened with individual bones and is as follows: skull alone, 90 per cent; pelvis alone, 95 per cent; combined skull and pelvis, 98 per cent; long bones alone, 80 per cent; long bones and skull, 90 to 95 per cent; long bones and pelvis, 95 per cent. For subadult remains in general, the degree of accuracy is about 50 per cent, except for the pelvis, when 75-80 per cent accuracy is possible (Krogman 1978:149).

Several techniques were used to determine the sex of the adult individuals represented in the McFayden population sample. Morphological analysis of the cranial remains indicated nine females and six males, a ratio of three females to two males. Only one female cranium could be sexed using morphometrical indices. Both morphological and morphometrical analyses were used to identify the sex of 23 mandibles. Observations of characteristics common to females and males indicated the presence of 13 males and 10 females, a ratio of one female to 1.3 males. To check this method, discriminate function analysis was used on seven mandibles (the other 16 could not be measured accurately enough to be used in metrical analysis). When sex was determined for these 7 mandibles using both methods, the correlation between the morphological and morphometrical determinations was 100 per cent.

Four post-cranial bone types -- the femur, the talus, the calcaneus, and the innominate -- were also sexed using either morphological or morphometrical techniques. The femora were measured for midshaft circumstance, which indicated 13 males and 14 females, or nearly a one to one ratio. This technique, introduced by Black (1978), has proven 85 per cent accurate. Discriminant functional analysis used on the tali indicated the presence of five females and one male, a 5 to 1 ratio. For the calcanea, a minimum number of two females was identified using this method. Steele's (1974) method for sexing tali and calcanea is from 70 to 88 per cent accurate, depending on the bone type and number of functions used. A minimum number of four females and one male (a ratio of 41 to 1) was represented by right innominate fragments examined for morphological differences. This method was about 95 per cent accurate. Figure 9 illustrates the results of these methods, along with their respective percentages of accuracy. The largest quantities of bone types were represented by femurs and cranial remains, which results in a more equal male-female ratio when sexed. The smaller bone type samples on the other hand give significantly higher percentages of females than males.

Taking into consideration sampling error and the different methods used to sex the materials, the sex ratio for the adult population represented in the McFayden sample is probably balanced. This approximates what some researchers feel to be an accurate reflection of adult populations in general (Funkhouser 1978:23; Weiss 1972, 1973).

The overall health and fitness of the McFayden population was assessed by observing pathologies and using and reconstructed demography. Aside from a low percentage of dental caries, pathological problems were observed in the left ulna of a subadult (unsexed) and the right innominate fragment of an adult female. Both conditions were caused by an infectious trauma. Three individuals, as represented by mandibles, also exhibited signs of possible childhood diseases evidenced by enamel hypoplasia. Overall, these few signs of pathology indicate a fairly healthy population.

The life expectancy at birth for the McFayden population was calculated to be 19.9 years. Compared with other prehistoric populations (Table 33), this estimate was low. But, it was very close to the life expectancy computed for the Nanjemoy ossuaries in Maryland.

A crude mortality rate for the McFayden population was estimated to be 50.12 individuals per thousand per year. This estimate was lower than prehistoric populations from Kentucky and South Dakota, but higher than the populations represented at the Nanjemoy ossuaries.

From the above data, the population size was reconstructed using various time intervals as listed in Table 35. The population size was dependent on the number of years of deaths represented by the mound. Using population reconstructions and ethnohistorical data, a population size of around 200 was estimated.

From the demographic and morphological data produced by this study, and summarized above, a limited number of comparisons with aboriginal populations were possible. Cranial indices and stature estimates for the McFayden sample were compared with populations from other nearby sites. Cranial measurements resembled Siouan piedmont populations from Rk^{v}12, Or^{v}11, and Rd^{v}1, and posited Siouan coastal groups from SoC^{v}529 and Nh^{v}28. Other burial mound groups of questionable cultural affiliation were also used for morphological comparison. Cranial indices for skulls from Duplin County Mounds 1 and 2 were similar to those from McFayden, whereas such measurements from Cd^{o}1 in Cumberland County were not. The latter resembled Algonquian types found in Onslow County, just north of the McFayden site. Given its position in the interior of the coastal plain, however, the population represented at Cd^{o}1 was probably associated with an Iroquoian people.

Stature estimates for the McFayden population were subject to considerable sampling error, as the techniques used to estimate length of the long bones were derived from white and Negro populations. Further problems come from using the Mongoloid regression formula to estimate stature. This formula has been criticized (Steele 1970) for the heterogenity of the sample Mongoloid population from which it was derived. Aside from these problems, the McFayden population had statures similar to populations from SoC^{v}529, Cd^{o}1, and On^{v}305, but they were significantly taller than the posited Siouan population of nearby Nh^{v}28. As two of the sites, Cd^{o}1 and On^{v}305, were non-Siouan, it was more than likely that this discrepancy was related to sampling errors and to problems associated with determining length from fragmented long bones.

In general, however, the McFayden population resembled in morphology Siouan populations from the southern coastal and piedmont regions of North Carolina and the northern coastal region of South Carolina. The skulls from Onslow and Pender Counties, when compared with the McFayden skulls, resembled an Algonquian or Lenipid physical type.

The question of ethnic-cultural associations of the sand burial mounds, it is probable that such features cannot be associated with any one prehistoric physical type or aboriginal group. In the coastal plain of North Carolina, it would appear that peoples with different physical characteristics and material culture were responsible for the construction of some of the mounds excavated to date. Available data (Stewart 1966), for example, suggests that a non-Siouan population, probably Ironquoian, was responsible for the construction of Cd^{o}1, the McLean Mound in Cumberland County. Presumably, these Indians were the predecessors of the historic Tuscarora of the inner coastal plain. The McFayden Mound, on the other hand, was probably built by Siouan people, as were the Duplin County 1 and 2 Mounds excavated by Holmes. Speculating further, the "ossuary" at Nh^{v}28, across the Cape Fear River from McFayden in New Hanover County could represent an initial stage in the construction of a burial mound. The skeletal remains at $Nh^{V}28$ could be the central bone deposit of a planned burial mound that was not completed. Limited evidence to support this interpretation is the physical location of $Nh^{V}28$ on a sandy ridge, as with the other sand burial mounds including McFayden; the Siouan physical associations of the skeletal material within the $Nh^{V}28$ deposit; and the lack of any substantial pit associated with the $Nh^{V}28$ feature, as is usually the case with ossuaries used by the Algonquians to the north (such as those of the northeastern North Carolina coast and the Nanjemoy Ossuaries in Maryland). Further work is needed on the southeastern North Carolina coastal plain before these speculations can be assessed.

Implicit in the above discussion is the identity of the people who actually constructed the mound. It can be asked whether the aborigines identified historically as the Cape Fear Indians, or their immediate ancestors, used the sand burial mound at McFayden. There was no mention of the mound in Hilton's description of the area in 1664, and no date can accurately be assigned to this mound, or any of the others in the region, for that matter. The Siouan affiliation of the skeletal material from McFayden corroborates the connections of the Cape Fear Indians with other Siouan Indians postulated by Mooney, Swanton, and others. This assumes the Cape Fear Indians were somehow associated with the mound. Such an affiliation cannot actually be conclusively demonstrated, however.

If the McFayden Mound (and the Duplin County Mounds) dates to the Late Woodland Period, say after A.D. 1400, then the Indians along the lower Cape Fear probably were Siouan. Several new questions suitable for future research are raised if such is the case. Combined with the low incidence of dental caries indicative of a non-maize agricultural group, is Hilton's lack of documentation of any cultivated plant food. The question arises as to whether the late prehistoric/historic Cape Fear Indians were non-maize agriculturalists. Logically, this leads into the question of when maize agriculture appeared on the southeastern coast, which cannot be addressed here due to lack of time and data.

For the sand burial mounds in general, the interrelationship of all these mounds in North Carolina remains in doubt. Even the cultural manifestations associated with the burial mound complex are presently unknown. It would appear that the idea and use of sand burial mounds spread inland from the coast along the Cape Fear River. A possible explanation lies in the avoidance of conflict/competition of the Cape Fear Siouan populations and their cultural heritage with the Algonquian peoples and culture along the North Carolina coast north of the Cape Fear. Two questions basic to future research in this area are: (1) Where do the cultural and physical boundaries between the Algonquians and Siouans, both prehistoric inhabitants of the area, exist? and (2) Why are these boundaries where they are? An optimal diet model, combined with a second model to determine the productivity of coastal microhabitats, could lead to evidence that the Algonquians and Siouans utilized different environmental habitats which, in turn, led to the development and maintenance of both cultural and physical boundaries. An investigation involving burial mound, ossuary, and village excavations and concomitant analysis of faunal and floral materials, human skeletal remains, ceramics, architecture, and other archaeological materials would provide data pertinent to questions raised in this thesis; fill some of the existing gaps in the archaeological record of the area; and provide a synthesis of much that is currently known about the Late Woodland cultures of the coastal plain region of North Carolina.

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